Z KRAJU / HOME NEWS

TWORZYWA W LICZBACH

Tabele 1–4 zawierają dane dotyczące wielkości produkcji surowców i półproduktów chemicznych (tab. 1) oraz najważniejszych tworzyw polimerowych i polimerów (tab. 2), a także wybranych wyrobów z tworzyw polimerowych (tab. 3) i gumy (tab. 4) w marcu 2024 r.

T a b e l a 1. Produkcja surowców i półproduktów chemicznych w marcu 2025 r., t
T a b l e 1. Production (tons) of raw materials and chemical intermediates in March 2025

Artykuł	Średnia miesięczna w 2024 r.	Marzec 2025 r.	Razem I–III 2025 r.	% I–III 2025/ I–III 2024
Węgiel kamienny	3 685 345	3 607 314	11 238 716	97,9
Węgiel brunatny	3 418 819	3 278 906	11 169 610	111,2
Ropa naftowa – wydobycie w kraju	50 587	57 972	170 963	100,1
Gaz ziemny – wydobycie w kraju (tys. m^3)	402 935	476 578	1 381 491	99,9
Etylen	28 610	24 577	70 543	77,4
Propylen	32 222	36 604	103 044	112,0
1,3-Butadien	4 393	5 509	14 629	100,5
Fenol	3 148	3 294	10 024	86,9
Izocyjaniany	238	271	762	112,2
ε-Kaprolaktam	8 617	8 385	24 606	97,9

Wg danych GUS.

T a b e l a 2. Produkcja najważniejszych tworzyw polimerowych i polimerów w marcu 2025 r., t
T a b l e 2. Production (tons) of major polymer materials and polymers in March 2025

Tworzywo polimerowe/polimer	Średnia miesięczna w 2024 r.	Marzec 2025 r.	Razem I–III 2025 r.	% I–III 2025/ I–III 2024
Tworzywa polimerowe	261 577	294 344	812 509	98,5
Polietylen	26 062	23 649	72 525	90,3
Polimery styrenu	12 449	14 805	41 388	102,1
Poli(chlorek winylu) niezmieszany z innymi substancjami, w formach podstawowych	17 594	7 810	30 460	52,9
Poli(chlorek winylu) nieuplastyczniony, zmieszany z dowolną substancją, w formach podstawowych	3 322	3 388	10 111	97,0
Poli(chlorek winylu) uplastyczniony, zmieszany z dowolną substancją, w formach podstawowych	8 205	9 025	25 215	97,1
Poliacetale, w formach podstawowych	19	39	55	93,2
Glikole polietylenowe i alkohole polieterowe, w formach podstawowych	7 488	7 976	22 427	90,7
Żywice epoksydowe, w formach podstawowych	931	1 098	3 075	106,5
Poliwęglany	1 531	1 555	4 920	93,2
Żywice alkidowe, w formach podstawowych	2 031	2 631	7 737	113,0
Poliestry nienasycone, w formach podstawowych	7 654	7 883	21 067	89,6
Poliestry pozostałe	4 899	6 354	17 290	114,6
Polipropylen	25 693	54 674	121 150	145,6
Polimery octanu winylu w dyspersji wodnej	3 618	3 616	11 291	99,6
Poliamidy 6; 11; 12; 66; 69; 610; 612, w formach podstawowych	17 116	19 627	57 050	96,5
Aminoplasty	20 365	24 882	69 467	112,0
Poliuretany	1 689	1 745	5 380	120,3
Kauczuki syntetyczne	22 309	25 650	74 854	109,1

Wg danych GUS.

T a b e l a 3. Produkcja wybranych wyrobów z tworzyw polimerowych w marcu 2025 r.
T a b l e 3. Production of some polymer products in March 2025

Wyrób	Jednostka	Średnia miesięczna w 2024 r.	Marzec 2025 r.	Razem I–III 2025 r.	% I–III 2025/ I–III 2024
Wyroby z tworzyw polimerowych	tys. zł	6 828 748	7 129 928	20 397 705	99,6
Rury, przewody i węże sztywne z tworzyw polimerowych	t	27 420	30 176	82 476	106,8
w tym: rury, przewody i węże z polimerów etylenu	t	10 481	11 975	32 891	115,5
rury, przewody i węże z polimerów chlorku winylu	t	8 693	9 460	26 047	119,1
Wyposażenie z tworzyw polimerowych do rur i przewodów	t	4 342	5 177	13 689	110,5
Płyty, arkusze, folie, taśmy i pasy z polimerów etylenu, o grubości < 0,125 mm	t	52 127	58 938	174 776	104,1
Płyty, arkusze, folie, taśmy i pasy z polimerów propylenu, o grubości ≤ 0,10 mm	t	14 183	15 447	43 057	106,2
Płyty, arkusze, folie, taśmy i pasy z komórkowych polimerów styrenu	t	37 884	40 675	104 050	102,7
w tym: do zewnętrznego ocieplania ścian	t tys. m²	13 115 8 858	14 643 9 441	36 462 24 330	101,7 100,0
Worki i torby z polimerów etylenu i innych	t	27 059	28 326	82 174	103,1
Pudełka, skrzynki, klatki i podobne artykuły z tworzyw polimerowych	t	24 293	26 687	74 144	103,1
Pokrycia podłogowe (wykładziny), ścienne, sufitowe	t tys. m²	8 903 2 183	10 207 2 422	29 042 6 870	112,4 105,0
Drzwi, okna, ościeżnice drzwiowe	t tys. szt.	46 097 805	45 631 836	126 731 2 346	105,0 108,4
Okładziny ścienne, zewnętrzne	t tys. m²	299 107	251 64	684 161	102,5 98,8
Kleje na bazie żywic syntetycznych	t	6 472	8 813	26 019	207,6
Kleje poliuretanowe	t	1 492	1 644	4 737	109,5
Włókna chemiczne	t	2 863	3 006	8 866	103,6
Tkaniny kordowe (oponowe) z włókien syntetycznych	t tys. m²	1 332 4 251	1 425 4 551	4 080 13 022	99,0 117,5
Nici do szycia z włókien chemicznych	t	13	42	115	90,3

Wg danych GUS.

T a b e l a 4. Produkcja wybranych wyrobów z gumy w Marcu 2025 r.
T a b l e 4. Production of some rubber products in March 2025

Wyrób	Jednostka	Średnia miesięczna w 2024 r.	Marzec 2025 r.	Razem I–III 2025 r.	% I–III 2025/ I–III 2024
Wyroby z gumy, produkcja wytworzona	t	75 520	84 932	229 927	93,2
Opony i dętki z gumy; bieżnikowane i regenerowane opony z gumy	t tys. szt.	37 666 4 574	42 691 5 479	114 599 14 935	94,5 108,0
w tym: opony do samochodów osobowych	tys. szt.	2 246	2 519	6 731	102,4
opony do samochodów ciężarowych i autobusów	tys. szt.	245	366	972	133,9
opony do ciągników	tys. szt.	6	5	15	75,7
opony do maszyn rolniczych	tys. szt.	29	42	120	137,2
Przewody giętkie wzmocnione metalem	t	1 435	1 559	4 031	81,5
Taśmy przenośnikowe	t km	3 206 2 370	3 297 2 524	9 161 7 309	75,9 100,4

Wg danych GUS.

mgr inż. Małgorzata Choroś

SolidPlast boosts productivity and cuts costs with ENGEL's digital assistance systems

Kartuzy, Poland – Medium-sized injection molding specialist SolidPlast has significantly strengthened its market position through the strategic integration of digital assistance systems into its production processes. Founded in 2014 and operating out of Kartuzy near Gdańsk, the company has become a preferred supplier for brands like Aptiv, Avery Dennison, and Apator-Metrix by embracing intelligent automation and digital process optimization. Faced with market pressures such as tight cycle times, stringent quality requirements, and the need for energy-efficient production, SolidPlast turned to ENGEL's iQ digital solutions, with outstanding results. In 2022, the company launched serial production of a complex POM gas meter housing – a project with demanding tolerances and short cycle requirements. With existing machines lacking the necessary clamping force, SolidPlast opted for the ENGEL victory 220, a compact, column-less injection molding machine enhanced with iQ clamp control, which precisely calculates and regulates clamping force through real-time mold monitoring. The next major leap came in 2023 with the adoption of iQ hold control, an intelligent system that optimizes holding pressure based on material solidification behavior inside the mold. This allowed automatic, real-time adjustment of the holding phase, reducing cycle time while preserving product integrity. The impact was immediate and measurable: 11% increase in productivity, 4.2% reduction in serial production costs and no compromise on quality or dimensional stability. By combining iQ hold control, iQ clamp control, and iQ process observer, SolidPlast established a digitally enhanced production ecosystem. This integration not only increased machine efficiency but also reduced energy use and resource consumption – aligning with sustainable manufacturing goals. "Digitization is not an add-on but a core element of our production strategy," said a company spokesperson. "With ENGEL's support, we've created a system that allows us to respond faster, more sustainably, and more cost-effectively to evolving customer needs."

SolidPlast's success highlights how digital transformation in injection molding can offer tangible benefits even for mid-sized manufacturers – enhancing competitiveness in a demanding, high-precision market.

https://www.plastech.pl/

Tadeusz Nowicki reappointed to the Board of European Plastics Converters

Tadeusz Nowicki, President of the Polish Union of Plastics Converters (PZPTS), has been re-elected to the Board of European Plastics Converters (EuPC), reaffirming Poland's strategic role within the European plastics value chain. His continued presence in the EuPC leadership highlights the growing influence of Central and Eastern European processors in shaping the future of the industry. EuPC is the leading European association representing over 50,000 plastic converting companies, responsible for processing more than 50 million tonnes of polymer materials annually. Its membership is composed primarily of SMEs operating across diverse sectors, including packaging, technical components, and infrastructure. Mr. Nowicki's reappointment comes at a critical juncture for the industry, as it faces regulatory, economic, and environmental pressures related to the European Green Deal, packaging legislation reform, and the shift towards a circular plastics economy. His leadership ensures continued representation of practical industry perspectives in high-level policy discussions, particularly in support of sustainable transformation. With extensive experience as President of PZPTS and a longstanding advocate of industry-public sector dialogue, Nowicki's position on the EuPC Board enhances the visibility of Polish and regional stakeholders in Brussels. His role is expected to support the advancement of regulatory frameworks that recognize the realities of polymer processing and promote innovation, recyclability, and economic resilience. His renewed mandate strengthens the voice of Eastern European converters and offers a direct channel for influencing EU-level initiatives on industrial policy, sustainable materials, and advanced recycling technologies.

https://tworzywa.online/

Poland joins international call for ambitious plastics treaty at UN Ocean Conference

During the Fifth United Nations Ocean Conference (UNOC), held in Nice from 9–13 June 2025, Poland joined 94 other nations in endorsing the "Nice Wake-Up Call" – a political declaration urging the establishment of a legally binding United Nations treaty to address plastic pollution across the entire lifecycle of plastics. While the declaration is not legally enforceable, it signals a growing international consensus on the urgency of confronting plastic pollution at the source – not solely through improved waste management or recycling. The Nice Call explicitly advocates for upstream interventions, such as reductions in plastic production, the elimination of hazardous polymers and chemical additives, and regulatory design-for-sustainability principles. Poland's endorsement marks a significant political step, as the country has not previously positioned itself as a leading voice in international negotiations to restrict plastic production. As a major player in Europe's plastic processing sector – valued at over PLN 60 billion annually – Poland's stance could carry both regulatory and industrial implications. French Minister for Industry Agnès Pannier-Runacher emphasized during the conference that "better waste management and recycling are not enough – this is a lie that must be confronted." This rhetoric reflects a notable paradigm shift: away from end-of-life solutions and toward systemic transformation in material production

and design. Civil society organizations offered measured support. Greenpeace called the declaration "a necessary wake-up call," but warned that without legally binding measures and enforcement mechanisms, it risks remaining symbolic. WWF went further, describing the statement as "a minimum benchmark," insufficient on its own to constitute success. For Poland, the declaration presents both risks and opportunities. Stricter environmental regulations and potential restrictions on specific polymers or additives could challenge existing business models. Conversely, it may catalyze innovation in advanced recycling technologies, sustainable material reformulation, and circular design – strengthening the competitiveness of firms that invest in green innovation. Negotiations for the UN Global Plastics Treaty, initiated in 2022, were originally expected to conclude by December 2024. However, disagreements over the treaty's legal scope and enforcement mechanisms have delayed the process. The next negotiation round, INC-5.2, is scheduled for 5–14 August 2025 in Geneva, where the "Nice Wake-Up Call" may serve as a catalyst for concrete, binding international commitments.

https://tworzywa.online/

Czech investment fund acquires majority stake in Poland's Plastiwell International S.A.

Polish plastics processing group Plastiwell International S.A., a leading manufacturer of polymer-based products in Central Europe, has secured a new strategic investor. The Jet 3 fund, managed by Czech private equity firm Jet Investment, has acquired a majority stake in the company. This marks Jet Investment's first acquisition in Poland and reflects its broader strategy to consolidate the plastics processing sector across Central and Eastern Europe. Founded over two decades ago, Plastiwell International employs more than 1,000 people and operates three advanced production facilities located in Myślenice, Tarnów, and Bydgoszcz. The group generated revenues of approximately €100 million in 2024. It encompasses specialized subsidiaries including Polplast Polska, Tarnwell Polska, and TMR Plastics, the latter acquired in 2023 and known for its expertise in precision-molded plastic components for industrial and medical applications. Jet 3 Fund, with more than €100 million in committed capital, focuses on investments in manufacturing companies across Central Europe. The acquisition of Plastiwell International is a response to evolving market demands and aims to foster innovation, operational synergies, and regional scale. According to Marek Chłopek, Managing Director of Jet Investment Poland, "Plastiwell International is one of the fastest-growing plastics processors in the Polish market. The group has built a strong foundation through automation, in-house engineering, and strategic acquisitions. Our investment supports its continued development in high-value segments and sustainable solutions." Plastiwell International operates under a vertically integrated model, with in-house tooling, design, and serial production capabilities. Its clients span the automotive, electrotechnical, industrial, and sports sectors. The company holds IATF 16949 and ISO 9001 certifications, ensuring compliance with international quality standards. Notably, Plastiwell has intensified its commitment to circular economy principles, including the integration of recycled materials into its production streams. This aligns with both European regulatory trends and growing customer expectations regarding environmental responsibility. The transaction reflects increasing cross-border investment activity in Poland's manufacturing sector and underscores the strategic importance of polymer processing in regional industrial supply chains.

https://tworzywa.online/

Polimarky unveils RESTON – a new line of polyketone-based engineering compounds

During the 2025 edition of the Plastpol trade fair in Kielce, Polish compounder Polimarky, one of the country's oldest independent formulation specialists, introduced a new line of advanced materials under the RESTON brand. Developed entirely in-house by the company's R&D division, RESTON represents an innovative class of thermoplastic compounds based on polyketone (POK) – a semi-crystalline polymer with a perfectly alternating carbon-carbon backbone structure. This unique molecular architecture imparts RESTON with a rare combination of stiffness, strength, elasticity, and chemical resistance, positioning it as a potential alternative to conventional engineering plastics. Current RESTON grades are optimized for consumer goods, automotive applications, and the electrical and electronics (E&E) sector. The material's versatility also opens pathways for further development in under-the-hood automotive parts, gears, toys, packaging, and even medical applications. RESTON compounds are engineered for compatibility with standard polymer processing technologies including injection molding, extrusion, rotational molding, and blow molding. Polyketone-based materials can also be used for fiber spinning, coatings, and film production. They exhibit short injection molding cycles, excellent mold replication, and low warpage, typically requiring no post-conditioning. RESTON compounds are free from formaldehyde, tetrahydrofuran, and nitriles, and demonstrate low volatile organic compound (VOC) emissions, supporting health and environmental safety. Polyketone's carbon footprint is significantly lower than that of traditional engineering plastics such as POM, PA6, or PA6.6, contributing to more sustainable material choices. RESTON exhibits exceptional mechanical performance, including high impact resistance across a wide temperature range, outstanding wear resistance, and dimensional stability in humid or aqueous environments, outperforming many polyamides. In addition, RESTON demonstrates excellent tribological and insulating pro-

perties, making it suitable for demanding technical components. Certain polyketone grades can achieve UL 94 V-0 flame retardancy without the need for high levels of additives – an important feature for applications in electrical safety and regulatory compliance. With RESTON, Polimarky offers the market a forward-looking material that balances performance, processability, and environmental responsibility – and does so without requiring major technological retooling from plastics processors.

https://tworzywa.online/

Orlen VC invests in ReVentas to advance high-quality polyolefin recycling

Orlen VC, the corporate venture capital arm of Poland's largest energy and petrochemical group, has announced a strategic investment in ReVentas, a Scottish startup developing patented chemical purification technology for plastic waste. The innovative process enables the dissolution and decontamination of used polyolefins, specifically polyethylene (PE) and polypropylene (PP), by removing dyes, fillers, and odorants from post-consumer polymers. The result is high-purity recycled polymers suitable for demanding applications such as packaging, automotive components, and consumer goods. ReVentas' proprietary technology directly addresses one of the critical bottlenecks in plastics circularity: the inability of conventional mechanical recycling to yield materials with properties comparable to virgin resins. By contrast, the ReVentas method produces homogeneous, high-quality recyclates, helping to bridge the gap between regulatory requirements and technical feasibility. This is particularly relevant in light of upcoming EU legislation, which mandates that all plastic packaging must contain at least 10% recycled content by 2030. With polyolefins representing nearly 50% of global annual plastic production (approx. 390 million tonnes), scalable recycling solutions for PE and PP are essential for meeting circular economy targets. Yet, there is currently a shortage of high-quality secondary raw materials on the European market – especially those suitable for food-contact or closed-loop applications. Orlen VC's investment in ReVentas supports the expansion of this technology in Central and Eastern Europe, where plastic processing industries are seeking advanced recycling capabilities to ensure compliance and remain competitive. ReVentas has also secured funding from Beiersdorf Venture Capital and Scottish Enterprise, reflecting broader interest in technologies that support regulatory transitions and sustainability goals. This investment aligns with Orlen VC's broader commitment to the circular economy. Since its inception, the fund has invested approximately PLN 250 million (~€58 million) in 13 technology startups and two investment funds, focusing on energy transformation, advanced materials, and sustainable manufacturing solutions.

https://tworzywa.online/

Sustainability and strategic networking in the heart of Warsaw

On September 11, 2025, the enchanting garden of Confindustria Polonia's Warsaw office will host Green Grill, an exclusive event dedicated to sustainability and cross-sectoral networking. Designed to foster dialogue among key actors in the ecological and energy transition, the event is organized by Confindustria Polonia in collaboration with Italian Exhibition Group. Green Grill aims to strengthen institutional and economic ties between Italy and Poland, focusing on industrial, commercial, and project-based cooperation within the green economy. The event serves as a prelude to two leading international trade fairs: Ecomondo – The Green Technology Expo (4–7 November 2025) and KEY – The Energy Transition Expo (4–6 March 2026), both taking place in Rimini, Italy. These fairs are recognized as premier European platforms for showcasing innovations, policies, and technologies driving sustainable development. Set in the center of Poland's capital, Green Grill will offer an open forum for discussing strategic challenges and opportunities in ecological and energy transformation. Attendees will explore best practices, case studies, and new avenues for bilateral cooperation. The event is expected to draw a diverse audience from Poland's sustainability ecosystem, including recycling and environmental service providers, renewable energy firms, public institutions, financial stakeholders, and investors. Participants will gain valuable opportunities to connect with Italian partners, explore avenues for internationalization, discover emerging business models, and evaluate potential technological collaborations and investment opportunities. The program includes addresses by representatives of the Embassy of Italy, the Italian Trade Agency, and an expert briefing from the Scientific and Technical Committees of Ecomondo and KEY, outlining key European trends and regulatory shifts in the environmental and energy sectors. The event will conclude with a sustainability-themed garden barbecue, offering a relaxed yet impactful setting for informal discussions. Green Grill promises to be a meaningful encounter for companies, institutions, and startups from both Italy and Poland committed to building a greener future.

https://www.plastech.pl/

M.Sc. Mateusz Borkowski

WORLD NEWS

Alpla expands injection molding capabilities with acquisition of KM Packaging

Austrian packaging specialist Alpla is expanding its injection molding division, Alplainject, through the acquisition of KM Packaging GmbH. Headquartered in Ubstadt-Weiher, Germany, KM Packaging manufactures closures for tubes, bottles, and jars, operating six production sites across Germany, Austria, Poland, and the United States. With an annual output exceeding 6.5 billion injection-molded components, KM Packaging brings significant capacity and expertise to Alpla's portfolio. Approximately 500 employees and the existing management team will remain with the company post-acquisition. The transaction is pending approval from competition authorities. Financial terms have not been disclosed. "Injection-molded parts play a key part in our system-based approach to packaging," noted Michael Feltes, Managing Director of Alplainject. "KM Packaging, a well-regarded specialist in tube closures, caps and dispensing aids, is a perfect match for our concept." Founded in its current form in 2008 following the merger of Kutterer Kunststofftechnik and Mauer AG, KM Packaging traces its roots back to 1949. The company offers both standardized and customized closures and containers made from PP and PE, with cleanroom production capabilities and use of up to 100% post-consumer recycled material. Its product range includes HDPE screw caps and flip-tops for monomaterial packaging, catering primarily to the cosmetics, pharmaceutical, and food sectors. "The smooth combination of close customer relationships, technological expertise, and a focus on sustainability aligns closely with our profile," said Nicolas Lehner, Chief Commercial Officer at Alpla. The company reported €4.9 billion ($5.6 billion) in sales for 2024, marking a 4% increase year-over-year. The company continues its growth-through-acquisition strategy, with recent takeovers including Egyptian bottle producer Taba and Brazilian HDPE recycler Clean Bottle. Alpla also reaffirmed its sustainability commitment, aiming to double its plastic recycling capacity to 700,000 metric tons annually by 2030. "Our focus on the circular economy is paying off," the company stated.

https://www.plasticsnews.com/

Fiat integrates recycled beverage cartons in automotive industry first

In a significant step towards circular manufacturing, Fiat has become the first automaker to integrate recycled materials from used beverage cartons into a production vehicle. The latest model of the Fiat Grande Panda features interior components made using Lapolen Ecotek, a polymer-aluminum (polyAl) compound derived from post-consumer beverage cartons. Each vehicle incorporates material from approximately 140 recycled cartons, specifically utilizing the polyAl fraction – composed of thin layers of polyethylene and aluminum – recovered after paperboard fibers are separated. The compound is featured prominently in the dashboard, central console, and interior door panels, signaling confidence in both its performance and aesthetics. Fiat selected the material not only for its environmental benefits but also for its distinctive shimmering effect, attributed to the embedded aluminum particles. "The material's visibility in high-touch interior areas rather than hidden components is a testament to its aesthetic and technical viability," the company noted. The Lapolen Ecotek compound was developed by Lapo Compound, which collaborated closely with Fiat to meet both performance and design specifications. "We believe in creating products that not only meet strict quality standards but also help contribute to a circular economy by keeping valuable materials in use," said Giuseppe Crisci, General Manager at Lapo Compound. "Our product innovation has successfully met this technical challenge for Fiat, which is testament to our dedication to sustainable innovation." This collaboration also aligns with Fiat's broader sustainability strategy, which focuses on eliminating non-essential components and phasing out high-impact materials like chrome and leather. The initiative supports the company's "less is more" approach to vehicle design, centered on affordability and reduced environmental impact. Beverage cartons, typically made of 70% paperboard, 25% polymers, and 5% aluminium, have long posed a recycling challenge. While paperboard can be repurposed into products like tissue paper and napkins, finding high-value applications for the polyAl fraction has been more complex. "The use of recycled materials from beverage cartons in the Fiat Grande Panda is a fantastic demonstration of their vast potential across multiple industries," said Kinga Sieradzon, Vice President Sustainability Operations at Tetra Pak, which supported the project. "It's a powerful example of how sustainable solutions can drive innovation and reshape traditional manufacturing." The Fiat Grande Panda is already available in most European markets, with international rollout planned by the end of the year. The launch positions Fiat ahead of upcoming EU legislation, including the Commission's End-of-Life Vehicles Proposal, which will require that 25% of plastic used in cars comes from recycled sources. Lapolen Ecotek is thus not only a material solution but also a regulatory one. Beyond the automotive sector, Lapo Compound is

testing further applications for polyAl, including outdoor furniture and industrial flooring – indicating a broader shift toward integrating complex recycled materials in mainstream manufacturing.

https://interplasinsights.com/

Sidel's CoboREEL sets a new industry benchmark in label roll automation

Sidel has unveiled CoboREEL, a collaborative robot-based solution that sets a new industry standard for label roll loading in beverage packaging. Featuring an unmatched capacity of 18 rolls – three times higher than any alternative currently available – CoboREEL delivers 100% accuracy, boosts productivity, and minimizes operational disruptions by fully automating this repetitive task. The launch comes at a time when demand in the PET beverage sector continues to rise. Bottled water alone is projected to grow by 3.5% annually to over 350 billion liters by 2029, driven by factors such as limited access to clean drinking water, increased tourism, and away-from-home consumption – despite tighter regulations on single-use plastics. Similarly, the carbonated soft drinks category is expected to grow by 2.2%, with health and sustainability as key market drivers. To address the growing pressure on efficiency and cost optimization in these high-volume segments, Sidel developed CoboREEL to streamline the labeling process – a simple yet labor-intensive step in beverage packaging. By integrating collaborative robots (cobots), the system ensures fully automated, error-free roll loading without human intervention throughout an entire production shift. "Our customers are looking for smarter, leaner ways of operating – using fewer resources while increasing efficiency," explained Antonio Mancino, Product Manager for Labeling Solutions at Sidel. "With over 50 years of packaging expertise, Sidel continues to develop intuitive solutions that reduce costs, accelerate operations, and require minimal training." CoboREEL enhances production uptime by eliminating the need for manual roll changes, thus freeing up operators for value-added tasks. Once loaded at the beginning of a shift, CoboREEL operates autonomously, allowing workers to focus on more complex or engaging duties – ultimately improving concentration, job satisfaction, and overall plant performance. With its 18-roll autonomy, CoboREEL handles multiple label types and designs autonomously, eliminating the need for manual changeovers. Its plug-and-play format allows for mobile deployment across different lines, enabling flexible usage across facilities. The unit's compact, safety-oriented design features built-in traceability and consumes less than 0.5 kWh, helping manufacturers lower their environmental footprint. "CoboREEL doesn't just automate a task – it transforms it," said Mancino. "By drastically reducing errors, delays, and downtime, it delivers measurable returns on investment and provides a future-ready solution that aligns with the evolving demands of the beverage market."

In addition to improving reliability and cost-efficiency, the solution's standalone operability and ease of use make it particularly effective in environments with high operator turnover. With no technical expertise required, manufacturers benefit from rapid implementation and minimal onboarding time. In summary, CoboREEL represents a major leap in automation for beverage packaging, offering a smart, scalable, and sustainable approach that supports growth, flexibility, and long-term profitability.

https://www.plastech.pl/

Gentlebrand reimagines Tashkent icon for premium PET mineral water launch

Design agency Gentlebrand, part of the Sidel Group, has collaborated with Uzbekistan-based Toshmineralsuv to elevate the image of its flagship product – Tashkentskaya mineral water – through a sophisticated redesign tailored for the premium PET segment. Known for its purity and deep origins – drawn from a natural aquifer 1,371 meters below the surface – Tashkentskaya is now available in a sleek PET bottle that reflects both tradition and contemporary appeal. The project exemplifies Gentlebrand's strategic design philosophy, merging in-depth brand analysis with a refined creative approach. In aiming to preserve the essence of a water brand that has symbolized wellness and trust for over 70 years, the team developed a bespoke concept rooted in authenticity, cultural resonance, and visual simplicity.

"We began with a meticulous analysis of both the competitive environment and the brand's heritage," the agency explained. "This allowed us to craft a design that speaks to today's premium market while honoring the legacy of Tashkentskaya." The result is a cohesive visual identity that reinforces the product's positioning as a source of health and beauty. The new PET bottles – available in 1000 ml, 500 ml, and 330 ml formats – feature clean lines and finely tuned details. A delicate embossing at the base communicates the brand's core message, while a geometric motif inspired by Tashkent's architecture seamlessly blends tradition with modernity. Notably, every design element contributes to a broader narrative. From the minimalist transparent label to coordinated in-store applications, the updated branding creates a strong, premium presence without compromising the product's long-standing character. "Gentlebrand was able to perfectly interpret our vision and translate it into a distinctive design that aligns with our brand values," said the Toshmineralsuv bottling plant manager. "The result is a product that truly represents us and allows us to stand out in the market." This redesign not only enhances shelf appeal but also affirms the brand's identity in a rapidly evolving beverage market. It is a packaging solution that delivers a sense of exclusivity and refinement while staying true to what the product has always stood for: purity, wellbeing, and cultural pride.

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LyondellBasell enters exclusive agreement with AEQUITA to divest European olefins and polyolefins assets

LyondellBasell has entered into an exclusive agreement with AEQUITA to divest a selection of its European olefins and polyolefins (O&P) assets, marking a strategic step forward in the company's transformation agenda. The proposed deal includes integrated and standalone sites in Berre (France), Münchsmünster (Germany), Carrington (UK), and Tarragona (Spain), along with associated business operations and supporting central functions in Rotterdam and other locations. "This contemplated transaction is a significant step in LYB's transformation to Grow and Upgrade our Core," stated Peter Vanacker, Chief Executive Officer at LyondellBasell. "We are committed to operate our assets safely and reliably throughout this process and will continue to support our customers, employees and other key stakeholders." The move supports LYB's strategy to strengthen profitability and leadership in circular and renewable solutions, while maintaining a focused presence in Europe. "Europe remains a core market for LYB and one we will continue to participate in following this transaction," Vanacker added, emphasizing the company's renewed focus on value creation and innovation. AEQUITA, a German investment group known for industrial transformations, will acquire a scaled O&P platform with proximity to key customer bases across the region. The acquisition includes not only production facilities but also operational infrastructure and experienced talent. Christoph Himmel, Managing Partner at AEQUITA, commented: "The acquisition of these assets from LYB marks another important step in expanding our industrial footprint. Each site brings a strong operational foundation and a highly experienced, committed employee base. We are confident in our ability to accelerate their development under AEQUITA's ownership approach." The agreement includes a put option deed, obligating AEQUITA to proceed with the purchase under agreed terms should LyondellBasell choose to exercise the option. The transaction is expected to close in the first half of 2026, pending regulatory approvals and customary closing conditions. "We look forward to welcoming the teams into our Group and to working collaboratively with all stakeholders to ensure a smooth transition and establish a strong platform for long-term success," Himmel added. Citi and J.P. Morgan Securities LLC acted as financial advisors, while Linklaters LLP provided legal counsel to LyondellBasell.

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Scientists at University of Edinburgh transform PET Waste into paracetamol using engineered microbes

In a groundbreaking development in sustainable biochemistry, scientists at the University of Edinburgh have successfully converted post-consumer PET plastic waste into paracetamol, the widely used over-the-counter painkiller. The process, developed by researchers in the Wallace Lab, showcases the potential of biotechnology to address both pharmaceutical production and plastic pollution. The research team used hydrolysis to depolymerize PET flakes – sourced from discarded plastic bottles – into their monomers, including terephthalic acid (TPA). Using genetically engineered *E. coli*, they then fermented TPA into paracetamol within 24 hours, achieving a conversion efficiency of approximately 90%. "This work demonstrates that PET plastic isn't just waste or a material destined to become more plastic – it can be transformed by microorganisms into valuable new products, including those with potential for treating disease," said Professor Stephen Wallace, Chair of Chemical Biotechnology at the University of Edinburgh and lead author of the study. Crucially, the process was carried out at room temperature with near-zero carbon emissions, offering a compelling alternative to traditional paracetamol synthesis, which typically relies on fossil-fuel-derived phenol and acetic anhydride, as well as high-energy industrial inputs. The breakthrough aligns with global efforts to integrate synthetic biology and green chemistry to reduce waste and emissions in pharmaceutical manufacturing. Experts believe this represents a major step forward in creating microbial "living factories" capable of producing essential chemicals from renewable or waste-derived feedstocks. While still at the lab-scale, researchers say the technology has clear potential for commercial-scale deployment with further development. The findings were published in Nature Chemistry under the title "A biocompatible Lossen rearrangement in *Escherichia coli*". The research was supported by an EPSRC CASE award and AstraZeneca, with assistance from Edinburgh Innovations, the university's commercialization service.

https://www.sustainableplastics.com/

M.Sc. Mateusz Borkowski

TECHNICAL NEWS

Sneakers made from recycled wind turbine blades

In an innovative crossover of renewable energy and sustainable fashion, Spanish sneaker brand El Ganso has partnered with Acciona Energía, a leading wind energy operator, to launch a limited-edition line of sneakers featuring soles made from recycled wind turbine blades. The initiative stems from a repowering project at a wind farm in Cádiz, Spain, where Acciona Energía is replacing 98 legacy turbines (installed in 1998) with 13 next-generation Nordex turbines. The upgrade is expected to boost the wind farm's energy output by 72%. Central to the collaboration is a specialized recycling process developed by Acciona Energía. After three months of R&D, the company succeeded in producing a fine powder made from epoxy resin and glass fibers extracted from decommissioned blades using mechanical friction technology. This material is then blended with rubber to form the sustainable outsole of the El Ganso sneakers. "While most wind turbine components – like steel, copper, and concrete – are easily recyclable, blades made from composite thermoset materials pose a significant challenge," said Asun Padrós, Head of Innovation at Acciona Energía. "This project shows that creative reuse is possible." This is not Acciona Energía's first foray into blade recycling. Previous projects include a 2023 sneaker collection, surfboards in Australia, and structural components for solar farms. To scale its efforts, the company is developing a dedicated industrial recycling plant in Lumbier (Navarra), capable of processing 6,000 tonnes of blades annually, to serve sectors like automotive and construction. The urgency is real: Spain is expected to decommission and recycle about 20,000 wind turbine blades in the coming years. Acciona Energía is part of the RenerCycle consortium, working toward large-scale, circular solutions for wind energy infrastructure. The sneaker collaboration stands as a symbolic and tangible step toward circularity, transforming waste from the clean energy sector into sustainable consumer goods – quite literally allowing consumers to run with the wind beneath their feet.

https://www.plasticstoday.com/

High-performance injection molding machines for advanced technical applications by BMB

Italian injection molding machine manufacturer BMB continues to expand its global presence, now placing a stronger focus on technical molding for sectors such as automotive, home appliances, and medical technology. Renowned for its high-speed, reliable machines for thin-walled packaging, BMB is now leveraging its expertise to deliver tailor-made, high-precision solutions beyond the packaging sector. At the heart of BMB's strategy is the commitment to electric and hybrid drive technologies, offering greater energy efficiency, precision, and repeatability compared to traditional hydraulic systems. A testament to this approach is the newly developed eKW-85Pi / 5500 Hybrid, an 850-ton hybrid injection molding machine engineered for Italian manufacturer Tech-Pol, a key supplier to premium brands such as BMW and AUDI. The machine features dual injection units (5500 and 700 cm^3, Euromap classification), a rotary table, and a wide tie-bar spacing, enabling the efficient production of two-component parts with exceptional synchronization and dimensional accuracy. It also incorporates BMB's proprietary Torque motors and satellite ball screw systems, a technology choice dating back to 2002 that still stands out in today's market for its durability and performance. A unique hallmark of BMB is the modular flexibility of its machines. Each system can be configured to match the specific demands of the final product, whether it requires short cycles and high output (as in packaging), or large platens and complex molding precision (as in technical parts manufacturing). The company's four production facilities, strong R&D focus, and customer-driven engineering approach enable BMB to compete successfully with global giants – often ten times its size – by offering cutting-edge solutions without compromising on customization and quality. With an ever-growing reputation as a premium supplier of precision molding technology, BMB reaffirms its position not only in the packaging industry, but also as a trusted partner in highly demanding technical applications around the world.

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EREMA launches TwinPro: high-performance twin-screw extrusion with integrated preconditioning unit

At K 2025, Austrian recycling technology leader EREMA will unveil TwinPro – a next-generation plastics recycling system that directly couples a twin-screw extruder with the company's proprietary Preconditioning Unit (PCU). Designed specifically for complex waste streams such as multi-layer films and thin-walled packaging, the TwinPro marks a significant technological advancement in mechanical recycling. Developed over two years through intensive R&D and close collaboration with industrial partners, TwinPro combines the superior homogenisation and mixing capabilities of twin-screw extrusion with EREMA's patented Counter Current

technology. The PCU – a key component of EREMA systems – pre-shreds, heats, dries, compacts, and buffers the input material, ensuring consistent and efficient feed to the extruder, even with low bulk density waste such as film or PP flakes. "With TwinPro, we've brought a new generation of extrusion technology to market," explains Markus Huber-Lindinger, Managing Director at EREMA. "By directly connecting our proven PCU to a twin-screw extruder, we're setting new standards for recycling performance and flexibility. During development, we focused on combining our deep expertise in material handling with the processing advantages offered by twin-screw systems." This integrated design eliminates the need for separate agglomeration or stuffing units and handles bulk densities ranging from 30 to 800 g/l in a single process step. After PCU preconditioning, material is transferred tangentially into the twin-screw extruder, where it undergoes intensive homogenisation. This step is essential when processing multi-layer films containing different polymers (e.g., PE-PA, PE-EVOH), enabling the production of recycled pellets with improved mechanical properties suited for high-demand applications. Originally developed for complex film waste, TwinPro also unlocks new capabilities in recycling 3D packaging, including hot-washed PP flakes from very thin-walled packaging such as yogurt tubs – materials known to challenge conventional feeding systems. The PCU not only ensures continuous throughput but also effectively removes residual moisture and odours, improving downstream pellet quality. This innovation is part of EREMA's current Edvanced Recycling campaign, showcasing advanced recycling technologies tailored for tomorrow's material challenges. With over 40 years of experience and application know-how, EREMA continues to deliver systems that meet the most demanding quality and regulatory standards – from food-grade regranulate to technical and cosmetic packaging solutions.

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OQ unveils 17 new polymer grades to accelerate sustainable innovation across key industries

OQ, a leading global integrated energy company, has launched 17 new polypropylene (PP) and polyethylene (PE) grades over the past year – underscoring its commitment to delivering high-performance, application-specific polymer solutions that respond to emerging global needs. These advanced materials will make their European debut at K 2025, marking a significant milestone in OQ's innovation journey. The new grades are engineered to support a range of industries – from packaging and infrastructure to consumer goods – with enhanced durability, aesthetics, and processability. In line with megatrends such as food preservation, water security, and energy efficiency, the expanded portfolio empowers converters and brand owners with more tailored options to accelerate product development and sustainability goals. "This expansion reflects OQ's commitment to delivering application-focused solutions that align with what matters most to our customers – durability, speed-to-market, and operational efficiency," said Abdulrahman Al Tamtami, Vice President, Global Marketing at OQ. "These aren't just new grades – they're new possibilities for our partners across the value chain." The 17 newly introduced grades include: 6 PP Impact Copolymers for rigid packaging, housewares, and durable goods – offering an excellent balance of flowability, impact strength, and stiffness; 4 PP Random Copolymers with enhanced clarity and organoleptic properties, ideal for food containers, closures, and premium housewares; 2 PP Homopolymers designed for spunbond nonwoven applications, delivering superior fiber strength and processing consistency; 5 PE Grades, including Luban LL-8446.21, a rotomoulding solution engineered for water storage and road safety applications, featuring exceptional impact resistance, long-term durability, and UV stability. These solutions aim to address critical industry challenges, such as reducing food waste through high-performance packaging, enabling long-life water storage tanks that support urban infrastructure and water resilience, and offering recyclable rigid packaging with high visual and tactile appeal. In parallel, OQ's latest grades support the growing demand for resource-efficient consumer goods, helping manufacturers improve product quality while lowering environmental impact. Whether it's enhancing reusability, improving production yield, or enabling circular design, OQ's materials are tailored for the future of performance and sustainability.

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Syensqo launches bright orange flame-retardant PPA for enhanced EV safety

Syensqo has introduced Amodel® PPA HFFR-4133 Orange (OR), a high-performance flame-retardant polyphthalamide (PPA) designed to meet stringent safety and visibility requirements in electric vehicle (EV) applications. The innovation expands the company's portfolio of advanced materials for e-mobility, with a vibrant orange color engineered to remain stable and bright even under extended heat exposure. In EV architecture, orange components have become an industry-standard visual safety cue, marking high-voltage connectors, busbars, and other live components for quick identification and risk mitigation. Syensqo's new grade aligns with this safety need and meets or exceeds regulatory and industry benchmarks, including ISO 6469-3, IEC 60664, and UL V0 flammability standards. "Our new Amodel® PPA HFFR-4133 OR not only delivers excellent thermal and flame resistance but ensures long-term color stability in demanding EV environments," said a Syensqo spokesperson. "This innovation supports the industry's growing demand for both functional safety and aesthetic consistency, particularly in high-voltage EV systems."

Formulated for hot water moldability, the new material offers processing flexibility while maintaining mechanical integrity in critical high-voltage components. It joins Syensqo's broader EV battery safety materials portfolio, including Xencor® LFT XTreme PPA LGF-1045 ECHO BP, developed for thermal runaway protection, and Amodel® PPA AE-8945 HFFR, engineered for high-voltage pyrofuses. Beyond the automotive sector, Syensqo has also advanced its Non-Fluorosurfactant (NFS) technology, introducing the first peroxide-curable FFKM polymers free from fluorosurfactants. These grades, including Tecnoflon® PFR X7000 and X7100, are now available for trial and target applications in semiconductor dry and plasma environments, where clean processing and long-term durability are critical. The earlier release of nitrile-curable NFS FFKM grades – PFR X6055B, X6160B, and X6265B – has already gained commercial traction in the semiconductor sealing market, offering sustainable solutions without compromising performance or chemical resistance. As part of its strategic roadmap, Syensqo remains focused on battery safety and DC fast-charging infrastructure, both seen as pivotal to accelerating the transition to battery electric vehicles (BEVs) and supporting global decarbonization goals.

https://www.plasticstoday.com/

Palsgaard introduces sustainable anti-fouling additive for PE and PP polymerization

Palsgaard A/S, a global leader in plant-based polymer additives, has launched a new anti-fouling additive designed to improve the polymerization process of polypropylene (PP) and polyethylene (PE). Developed from renewable raw materials, the new Einar® 987 additive offers a safe and sustainable alternative to conventional ethoxylated amine (EA)-based chemistry, which has raised increasing health and environmental concerns. Delivered as a clear, viscous liquid, Einar® 987 is based on a proprietary blend of polyglycerol esters (PGE) and vegetable-derived fatty acids. As a non-toxic, food-contact-approved additive, it represents a compliant and efficient drop-in solution for resin producers seeking to replace EA additives without compromising performance. Drawing on its deep expertise in antistatic and food-safe chemistry, Palsgaard engineered Einar® 987 to deliver equal or improved efficacy while ensuring a better safety and sustainability profile. "Polyolefin resin producers can benefit directly from this technology, as its antistatic performance prevents polymer powder from fouling reactor walls during polymerization," said Laura Juhl, Application Manager, Bio-Specialty Additives at Palsgaard. "This stabilizes the reaction temperature, maintains high throughput, and ensures consistent product quality." Einar® 987 is effective at low dosing levels of just 100 – 300 ppm, and supports long catalyst lifetimes without impacting productivity. It is especially relevant as the industry increasingly moves away from EA-based formulations due to regulatory and safety concerns. Having already conducted successful field trials with several resin manufacturers, Palsgaard offers technical support to help new customers implement the additive smoothly. Einar® 987 will be one of several bio-based solutions showcased at K 2025 in Düsseldorf. Visitors can explore the Einar® range of sustainable polymer additives at Hall 7, Level 1, Booth C15 from October 8 – 15, where Palsgaard's product and market specialists will be available for consultation.

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Innovative high-performance fillers for demanding polymers

Modern polymer systems can be specifically tailored to demanding applications through the use of advanced mineral fillers. Needle-shaped fillers such as Tremin 939 and plate-shaped fillers like Trefil Phlogopit significantly enhance the mechanical strength and thermal resistance of thermoplastic materials. For thermosetting materials, surface-treated quartz flours from the Silbond series have been relied upon for decades. These fillers play a crucial role in determining the mechanical, thermal, and electrical properties of epoxy resins – widely used in electrical engineering, including the production of transformers, dry-type transformers, and insulators. In components exposed to intense thermal cycling, the use of fused silica powders in the Silbond range prevents damage and ensures long-term durability. In elastomeric polymers such as fluoroelastomers and silicones, where high flexibility is essential, Tremin 283 blocky wollastonites are recommended for high-temperature, chemically resistant sealing rings. These fillers increase tensile strength and offer excellent dimensional stability. For applications such as tires, flooring, hoses, and cables, HPF The Mineral Engineers offers a broad selection of kaolins sourced from its own deposits. These provide enhanced modulus, tensile strength, and excellent colorability. As electrification advances, manufacturers of masterbatches and compounds face increasing challenges. Electrical components with high energy density require efficient heat dissipation while maintaining electrical insulation. Here, Silatherm products play a vital role in smart thermal management and are used in thermally conductive plastics. Even in recycled plastics, HPF provides intelligent solutions such as Rescofil, a functional additive that helps absorb unwanted odors – an increasingly relevant concern in post-consumer recycled materials. With decades of expertise in mineral filler processing, HPF also delivers optimized particle size distributions to enable higher filler loadings or mineral blends. Additionally, customized silanization tailored to the customer's system ensures improved homogenization and even better mechanical and thermal properties.

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M.Sc. Mateusz Borkowski

WYNALAZKI / INVENTIONS

Zastosowanie pigmentów organiczno-nieorganicznych do barwienia kompozycji polimerowych – Anna Marzec, Małgorzata Kuśmierek, Bolesław Szadkowski (Zgłoszenie Nr 446404, Politechnika Łódzka)

Wynalazek dotyczy zastosowania pigmentów organiczno-nieorganicznych do barwienia kompozycji polimerowej kauczuku butadienowo-akrylonitrylowego i kompozycji polimerowej kopolimeru etylenowo-norbornenowego, polegający na tym, że stosuje się pigmenty organiczno-nieorganiczne otrzymane znanym sposobem w reakcji barwników azowych w formie chlorków kwasowych z nieorganicznym nośnikiem sfunkcjonalizowanym związkiem krzemoorganicznym zawierającym w swojej strukturze 1, 2 lub 3 grupy aminowe (wg Biul. Urz. Pat. 2025, nr 16, 14).

Sposób wytwarzania wodoru z gazu ziemnego – Jarosław Milewski (Zgłoszenie Nr 449570, Politechnika Warszawska)

Przedmiotem zgłoszenia jest sposób wytwarzania wodoru z gazu ziemnego w procesie reformingu, obejmujący połączone etapy: reformingu parowego metanu (CH_4) z gazu ziemnego w wodór (H_2) i dwutlenek węgla (CO_2) poprzez reakcję z parą wodną w obecności katalizatora, separacji CO_2 od mieszaniny gazowej H_2 i CO_2, sprężenia odseparowanego CO_2 i wtłoczenia sprężonego CO_2 do złoża gazu ziemnego (wg Biul. Urz. Pat. 2025, nr 16, 14).

Sposób otrzymywania pigmentów hybrydowych oraz ich zastosowanie – Anna Marzec, Małgorzata Kuśmierek, Bolesław Szadkowski (Zgłoszenie Nr 446442, Politechnika Łódzka)

Zgłoszenie dotyczy sposobu otrzymywania pigmentów hybrydowych, polegający na tym, że sporządza się roztwór chinizaryny w mieszaninie wody i roztworu wodnego wodorotlenku sodowego o stężeniu 30%, po czym sporządzony roztwór poddaje się reakcji z podsiarczynem sodowym w temp. 50°C w trakcie intensywnego mieszania. Następnie dodaje się 15% roztworu wodnego kwasu solnego do uzyskania pH kwaśnego wskazanego przy użyciu papierka Kongo i po odsączeniu pod zmniejszonym ciśnieniem powstałego osadu leukochinizaryny, płucze się go wodą destylowaną, etanolem i po odsączeniu suszy w temp. 100°C w czasie 1 h. Otrzymany w ten sposób barwnik – leukochinizarynę poddaje się reakcji z silanem w temperaturze pokojowej w czasie 5 min, w trakcie intensywnego mieszania, a otrzymany produkt poddaje się dalej reakcji z nośnikiem w środowisku toluenu w czasie 24 h w temperaturze pokojowej przy intensywnym mieszaniu. Otrzymany w ten sposób pigment hybrydowy, po przesączeniu pod zmniejszonym ciśnieniem, przemywa się kilkakrotnie toluenem i etanolem i suszy w temp. 80°C w ciągu 24 h. Zgłoszenie obejmuje także zastosowanie pigmentów hybrydowych otrzymanych powyższym sposobem. Otrzymane pigmenty hybrydowe stosuje się do barwienia kompozycji polimerowej kauczuku butadienowo-akrylonitrylowego i kompozycji polimerowej kopolimeru etylenowo-norbornenowego (wg Biul. Urz. Pat. 2025, nr 16, 15).

Elektrochemiczny sposób odzysku metali z krzemowych ogniw fotowoltaicznych – Jakub Lach, Kamil Wróbel, Dorota Kolasa, Wojciech Tokarz (Zgłoszenie Nr 446425, Sieć Badawcza Łukasiewicz – Instytut Chemii Przemysłowej imienia Profesora Ignacego Mościckiego, Warszawa)

Istotę wynalazku stanowi elektrochemiczny sposób odzysku metali, w szczególności jednoczesnego odzysku srebra, miedzi i ołowiu z krzemowych ogniw fotowoltaicznych, poddanych uprzednio wstępnej obróbce mechanicznej i termicznej, następnie ługowaniu roztworem kwasu azotowego(V) i odfiltrowaniu frakcji stałych. Otrzymany roztwór z ługowania ogniw fotowoltaicznych poddaje się elektrolizie w układzie dwuelektrodowym, przy czym: na I etapie elektrolizę prowadzi się przy napięciu o wartości 0,5–1,6 V, do momentu zakończenia powstawania osadu katodowego. Następnie na II etapie elektrolizę prowadzi się przy napięciu o wartości 1,8–2,5 V, do momentu zakończenia powstawania osadu katodowego i anodowego, stosując jako katodę, jak i anodę, elektrodę platynową, elektrodę tytanową pokrytą warstwą platyny lub elektrodę tytanową pokrytą warstwą mieszaniny tlenków metali szlachetnych (wg Biul. Urz. Pat. 2025, nr 16, 16).

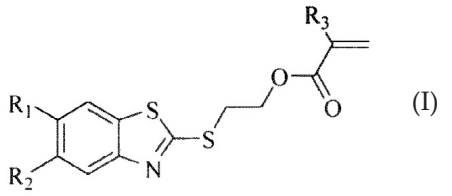
Sposób utleniania alkilowych pochodnych węglowodorów aromatycznych wobec katalizatora hybrydowego – Dawid Lisicki, Beata Orlińska, Dorota Talik (Zgłoszenie Nr 446502, Politechnika Śląska, Gliwice)

Przedmiotem zgłoszenia jest sposób utleniania alkilowych pochodnych węglowodorów aromatycznych do aromatycznych kwasów karboksylowych gazami zawierającymi tlen, polegający na tym, że proces obejmuje przygotowanie hybrydowego katalizatora, gdzie miesza się żel krzemionkowy z N-hydroksyftalimidem w stosunku masowym od 20:0,1 do 20:10 (korzystnie 20:2) w lotnym rozpuszczalniku, w temp.10–130°C (korzystnie w temperaturze wrzenia lotnego rozpuszczalnika) w czasie od 10 min do 4 h (korzystnie 2 h). Następnie odparowuje się rozpuszczalnik do suchej masy katalizatora, po czym prowadzi się proces utleniania alkilowych pochodnych benzenu w obecności 1% mol. do 10% mol.

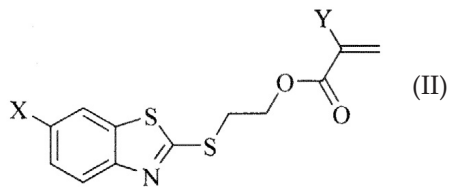
otrzymanego katalizatora (korzystnie 10% mol.) oraz w obecności 0,1–0,5% mol. związku kobaltu (korzystnie 0,5% mol.), w temp. 100–150°C (korzystnie 130°C), pod ciśnieniem 0,2–1,0 MPa (korzystnie 0,5 MPa), w czasie 0,5–4 h (korzystnie 2 h), z wykorzystaniem gazów zawierających tlen (wg Biul. Urz. Pat. 2025, nr 17, 16).

Nowe monomery akrylanowe pochodne benzotiazolu oraz sposób ich wytwarzania – Janina Kabatc-Borcz, Agnieszka Skotnicka (Zgłoszenie Nr 446483, Politechnika Bydgoska im. Jana i Jędrzeja Śniadeckich)

Przedmiotem rozwiązania według wynalazku są nowe monomery akrylanowe pochodne benzotiazolu, przeznaczone do zastosowania jako fotoinicjatory polimeryzacji oraz sposób ich wytwarzania, mające zastosowanie w produkcji fotoutwardzalnych kompozycji polimerowych. Nowe monomery akrylanowe pochodne benzotiazolu o wzorze (I), charakteryzują się tym, że R_1, R_2 oznaczają razem lub niezależnie od siebie atom chloru, atom wodoru lub grupę metylową, zaś R_3 oznacza atom wodoru lub grupę metylową. Sposób wytwarzania nowych monomerów akrylanowych pochodnych benzotiazolu do zastosowań jako fotoinicjatory polimeryzacji, charakteryzujący się tym, że mieszaninę reakcyjną zawierającą pochodną 2-merkaptobenzotiazolu o wzorze (II), w którym X i Y oznaczają razem lub niezależnie od siebie atom chloru, atom wodoru lub grupę metylową z 2-chloroetyloakrylanem w stosunku molowym substratów 1:1,03, ogrzewa się w temp. 55–60°C w czasie 8–20 h, po czym dodaje się 5% roztworu wodorotlenku sodu i ekstrahuje eterem dietylowym. Następnie ekstrakty osusza się siarczanem(VI)magnezu(II), kolejno rozpuszczalnik odparowuje, po czym surowy produkt oczyszcza się za pomocą chromatografii flash zbierając frakcje przy długości fali 278–285 nm, przy czym w roli eluenta stosuje się dichlorometan lub mieszaninę chloroform/etanol w proporcji 10:0,5 (wg Biul. Urz. Pat. 2025, nr 17, 16).



(I)



(II)

Płynny nawóz i zastosowanie płynnego nawozu w uprawie roślin – Hubert Kardasz, Karolina Bakalorz, Patrycja Krol, Karolina Seweryn, Martyna Macek, Agnieszka Mudyna, Anna Żurek, Adam Żaba, Roksana Rakoczy-Lelek, Krzysztof Ambroziak (Zgłoszenie Nr 446587, INTERMAG Sp. z o.o., Olkusz)

Wynalazek dotyczy płynnego nawozu i jego zastosowania w uprawie roślin. Płynny nawóz zawiera mikroelementy, takie jak B, Cu, Fe, Mn, Mo, Zn w ilości 0,5–9,0% mas., kwas glukonowy lub lakton kwasu glukonowego lub sól kwasu glukonowego w ilości 3,5–40% mas., sorbitol w ilości 0,1–10,0% mas., środek powierzchniowo czynny w postaci alkilopoliglukozydów w ilości 0,5–5,0% mas. oraz środek przeciwpienny zawierający glikol butylopropylenowy i oktametylocyklotetrasiloksan w ilości 0,01-0,3% mas.Stosunek molowy kwasu glukonowego lub laktonu kwasu glukonowego lub soli kwasu glukonowego do sumy mikroelementów B, Cu, Fe, Mn, Mo, Zn wynosi od 0,1 do 2,0. Nawóz zawiera także substancje stabilizujące, regulatory pH i wodę, a ponadto inne substancje wspomagające uprawę roślin, takie jak biostymulatory, makroelementy oraz witaminy. Stosuje się go w uprawie roślin w formie roztworu roboczego, po rozcieńczeniu go wodą, samodzielnie lub z innymi produktami nawozowymi, biostymulatorami oraz środkami ochrony roślin (wg Biul. Urz. Pat. 2025, nr 18, 11).

Kompozycja adhezyjna zawierająca żywicę mocznikowo-formaldehydową oraz jej zastosowanie – Marcin Kowalski, Marek Unolt, Mariusz Mamiński (Zgłoszenie Nr 446558, Przedsiębiorstwo Handlowo-Usługowe PROMA, Złotów)

Przedmiotem wynalazku jest kompozycja adhezyjna zawierająca żywicę mocznikowo-formaldehydową, charakteryzująca się tym, że zawiera żywicę mocznikowo-formaldehydową w ilości 42–82% mas., co najmniej jeden wypełniacz organiczny w ilości 3–25% mas., co najmniej jeden wypełniacz nieorganiczny w ilości 0–25% mas., mocznik lub melaminę w ilości 0,3–8% mas., co najmniej jedną sól amonową w ilości 0,1–6,5% mas., co najmniej jeden kwas organiczny w ilości 0–3,5% mas., oraz włókna celulozowe w ilości 0,5–3,5% mas. Kolejnym przedmiotem wynalazku jest zastosowanie kompozycji adhezyjnej według wynalazku do łączenia materiałów drzewnych oraz okleinowania materiałów drzewnych i drewnopochodnych okleinami naturalnymi i sztucznymi (wg Biul. Urz. Pat. 2025, nr 18, 12).

Sposób otrzymywania nanocząstek hydroksyapatytu (HAp) – Magdalena Stec (Zgłoszenie Nr 446658, Politechnika Śląska, Gliwice)

Zgłoszenie dotyczy sposobu otrzymywania nanocząstek hydroksyapatytu (HAp) o stosunku molowym atomów wapnia do atomów fosforu Ca/P wynoszącym 1,67, metodą krystalizacji reaktywnej wspomaganej ultradźwiękami, polegający na tym, że do reaktora o wymiarach L/d = 10–35 z wkładami statycznymi umieszczonego w łaźni ultradźwiękowej o mocy jednostkowej 10–30 W/kg, częstotliwości ultradźwięków 20–100 kHz i czasie oddziaływania ultradźwięków w przedziale 0,4–15s, wprowadza się jednocześnie substrat jonów

wapniowych o stężeniu 0,001–1 M i substrat jonów fosforanowych o stężeniu odpowiadającym molowemu stosunkowi atomów wapnia do atomów fosforu Ca/P wynoszącym 1,67, przy jednostkowej mocy mieszania 0,04–5 W/kg. Proces prowadzi się w temp.15–50°C, przy pH reakcji w zakresie 8–14, następnie zachodzi reakcja strącania. Otrzymaną zawiesinę odwirowuje się, stały HAp przemywa wodą dejonizowaną i suszy w temp. 40–110°C (wg Biul. Urz. Pat. 2025, nr 19, 12).

Lany poliuretan o zwiększonej zawartości węgla pochodzenia biologicznego i sposób jego otrzymywania – Joanna Niesiobędzka, Janusz Datta, Ewa Głowińska, Paulina Parcheta-Szwindowska (Zgłoszenie Nr 446662, Politechnika Gdańska)

Przedmiotem zgłoszenie jest lany poliuretan o zwiększonej zawartości węgla pochodzenia biologicznego i sposobu jego otrzymywania. Poliuretan ma zwiększoną zawartość węgla pochodzenia biologicznego od 42% do 88% masowo i zawiera: a) poliizocyjanian trojfunkcyjny zawierający węgiel pochodzenia biologicznego, przy czym w tym poliizocyjanianie zablokowana jest jedna grupa izocyjanianowa blokerem grup izocyjanianowych pochodzenia naturalnego, korzystnie w postaci 3-(pentadeka-3,11-dienylo)fenolu, korzystnie bloker zawiera co najmniej 98% węgla pochodzenia biologicznego; b) co najmniej jeden przedłużacz łańcucha, który prowadzi do zwiększenia masy produktu, korzystnie wybrany z grupy glikoli; c) co najmniej jeden poliol wybrany z grupy polioli poliestrowych lub polioli polieterowych (wg Biul. Urz. Pat. 2025, nr 19, 14).

Sposób wielokrotnego przetwarzania wyrobów z biodegradowalnego kompozytu termoplastycznego – Grzegorz Janowski, Wiesław Frącz, Łukasz Bąk, Janusz Sikora, Adam Tomczyk (Zgłoszenie Nr 446691, Politechnika Rzeszowska)

Wynalazek dotyczy sposobu wielokrotnego przetwarzania wyrobów z biodegradowalnego kompozytu termoplastycznego. Sposób według wynalazku charakteryzuje się tym, że wyrób z biodegradowalnego kompozytu zawierającego 55–85 cz. mas. poli(kwasu 3-hydroksymasłowego-*co*-3-hydroksywalerianowego) oraz 15–45 cz. mas. napełniacza w postaci zmielonych zużytych wysuszonych fusów kawy mieli się, po czym uzyskany regranulat suszy się. Następnie regranulat przetwarza się w temp.170–180°C oraz wytwarza się nowy wyrób (wg Biul. Urz. Pat. 2025, nr 19, 15).

Kompozyt o znacznie podwyższonej udarności na osnowie polilaktydu modyfikowany okta-(3-tiopropylo)silseskwioksanem oraz sposób jego wytwarzania na drodze wtrysku – Robert Przekop, Bogna Sztorch, Daria Pakuła (Zgłoszenie Nr 446764, Uniwersytet im. Adama Mickiewicza w Poznaniu)

Przedmiotem zgłoszenia jest kompozyt o znacznie podwyższonej udarności na osnowie polilaktydu modyfikowany okta(3-tiopropylo)silseskwioksanem oraz sposób jego wytwarzania na drodze wtrysku, mający zastosowanie do produkcji wyrobów z tworzyw polimerowych. Kompozyt o znacznie podwyższonej udarności na osnowie polilaktydu z modyfikatorem, którego stanowi osnowa polilaktydu (PLA) w ilości 99,975–95,0% mas. oraz modyfikator krzemoorganiczny okta(3-tiopropylo)-silseskwioksan, będący olejowym produktem kondensacji hydrolitycznej 3-merkaptopropylotrimetoksysilanu, stanowiący mieszaninę całkowicie skondensowanych struktur klatkowych oraz niecałkowicie skondensowanych silanoli (zwany jako okta(3-tiopropylo) silseskwioksan SSQ-8SH) w ilości 0,025–5,0% mas. (korzystnie 0,10–50% mas.). Sposób wytwarzania kompozytu na drodze wtrysku, polega na tym, że otrzymywanie kompozytu przebiega dwuetapowo: na pierwszym etapie wytwarza się 5% koncentrat poprzez homogenizację okta(3-tiopropylo)silseskwioksanu (SSQ-8SH) i polilaktydu (PLA) w proporcji 5% SSQ-8SH : 95% PLA w temperaturach przetwarzania polimeru do uzyskania jednorodnego układu. Następnie granuluje, na drugim etapie otrzymany granulat rozcieńcza się czystym polimerem PLA poprzez dodanie 0,5-50% mas. koncentratu do 99,5-50% mas. polilaktydu, a w końcowym etapie składniki miesza się, następnie poddaje znanym procesom przetwórczym do uzyskania gotowego wyrobu (wg Biul. Urz. Pat. 2025, nr 20, 12).

Kompozyt biodegradowalny i sposób wytwarzania naczyń jednorazowych z kompozytu biodegradowalnego – Marcin Sprawka, Szymon Klimas (Zgłoszenie Nr 446759, Onewoodtop Sp. z o.o., Chorzów)

Wynalazek dotyczy wytwarzania kompozytu biodegradowalnego nadającego się do kontaktu z żywnością, zawierającego osnowę, którą jest mieszanina wielocukru roślinnego, plastyfikatora, białka i substancji pomocniczych oraz zawierający zbrojenie pochodzenia roślinnego w postaci pyłu celulozowego, a także sposób wytwarzania z niego naczyń jednorazowych w procesie formowania pod zwiększonym ciśnieniem i przy podwyższonej temperaturze (wg Biul. Urz. Pat. 2025, nr 20, 13).

mgr inż. Małgorzata Choroś

NEW BOOKS

NANOTECHNOLOGY-ASSISTED RECYCLING OF TEXTILE WASTE: SUSTAINABLE TOOLS FOR TEXTILES

Editors: Prashansa Sharma, Shilpi Shree Sahay (Wiley)
1st edition, 2025, 528 pages, 173.99 EUR
ISBN 9781394174492
ISBN 9781394174997 (e-Book)

This book investigates nanotechnology-assisted sustainable solutions and their potential to transform waste into opportunity by fostering innovative designs and in-depth knowledge of sustainable waste management and nanotechnology applications. Divided into four comprehensive parts, comprising 16 chapters, editors and authors provide insights into the potential of nanotechnology in revolutionizing textile recycling and shaping the future of sustainable textiles. Part I presents an insightful overview of textile waste and management, exploring the conceptual dimensions and challenges in handling and organizing textile waste. It also describes the innovative realm of textile recycling. Part II focuses on comprehensive, sustainable, and productive recycling of waste using nanotechnology. Here, readers are invited to explore the transformative contributions of nanotechnology in shaping sustainable textile design and characterizing functional properties of novel recycled nanotextiles. Future perspectives of nanotechnology in textile applications, particularly concerning waste recycling, are also examined. Part III explores deeper into the advanced application of recycled and nano-assisted novel textiles generated through waste. From sports textiles to technical textiles, this section explores the diverse applications of recycled waste, enhanced by nano-engineered innovations. Finally, Part IV addresses the critical aspects of quality control and regulatory compliance in the realm of advanced nano-textile materials through an exploration of global legislation, schemes, and standards. The book will be read by a range of researchers, engineers and students in technical textiles, textile technology and engineering, textile chemistry, fiber science, textile processing technologies and manufacturing, fashion and textile technology, materials science and environmental science. This book will help designers and clothing manufacturers, and all those in textile and environmental domains, who are engaged in waste management.

MOLECULAR NANOGRAPHENES
Synthesis, Properties, and Applications

Editors: Nazario Martin, Colin P. Nuckolls (Wiley)
1st edition, 2025, 544 pages, 133.99 EUR
ISBN 9783527353224
ISBN 9783527845002 (e-Book)

Graphene, comprised of a single layer of carbon atoms in a honeycomb nanostructural arrangement, is the thinnest and strongest material yet known to science. Despite that this pristine carbon allotrope exhibits a variety of outstanding properties, its zero bandgap prevents its use for some optoelectronic applications. Fragments of graphene, or nanographenes, have shown a great potential to prevent these problems, thus paving the way for the development of chiroptical and optoelectronic properties. This book can be considered as a comprehensive overview on the synthesis of these materials and their properties. Covering their widely varying morphologies, their potential applications, and their valuable chiroptical and photophysical features, it also analyzes multiple approaches to obtain nanographene by using both top-down and bottom-up methodologies. The result is a one-stop shop for materials scientists and other researchers interested in these emergent and fascinating materials. This publication is ideal for materials scientists, polymer chemists, solid state chemists, organic chemists, and any other researchers looking to work with shape and size-controlled flakes of graphenes.

ENGINEERED POLYVINYL PYRROLIDONE PRODUCTS BY MICROWAVE TECHNIQUES
Processing, Characterization, and Applications

Authors: Pinki Pal, Gautam Sen, Jay Prakash Pandey (Elsevier)
1st edition, 2025, 278 pages, 168.99 EUR
ISBN 9780443315404
ISBN 9780443315411 (eBook)

Authors of this publication provide an indispensable guide to customizing polyvinyl pyrrolidone (PVP) properties through derivatization using microwave techniques. The book showcases the benefits of microwave radiation in polymerization, providing consistency and reproducibility without altering the polymer structure. It covers the successful modifications achieved and underscores the unique advantages of these techniques. The book delves into diverse applications of these specialized plastics in agriculture, medicine, and consumer products. It also discusses scaling up synthesis processes for commercial production, making it a valuable reference for understanding the potential of engineered polymeric materials.

RUBBER MATERIALS
Fundamentals, Sustainability, and Applications

Editors: Marianella Hernández Santana, Saul Utrera-Barrios (Elsevier)
1st edition, 2025, 688 pages, 228.99 EUR

ISBN 9780443315404
ISBN 9780443315411 (e-Book)

This book provides a fresh perspective on the potential of rubber materials in the 21st century when our global society faces unprecedented challenges related to resource consumption, waste management, and environmental impact. The book begins with an overview of the foundation of rubber science, covering fundamental principles, recent advancements, and future challenges. Sections discuss sustainability aspects and emerging trends within elastomer science and technology, all within the context of the 7Rs of the circular economy. Finally, the book presents advanced sustainable applications of rubber materials in diverse fields, including robotics, healthcare, energy, and more. This publication serves as a valuable reference to materials scientists, industrial and academic researchers, and R&D professionals seeking to explore sustainable solutions in the realm of rubbers and elastomers, including their green applications.

FIBER-REINFORCED POLYMER COMPOSITES
Materials and Manufacturing

Authors: Madhu Puttegowda, Sanjay M. R, Suchart Siengchin (Elsevier)
1st edition, 2025, 446 pages, 231.99 EUR
ISBN 9780443275463
ISBN 9780443275470 (eBook)

The publication systematically explores the essential concepts and latest advancements in fiber-reinforced polymer composites. This comprehensive book begins with an introduction to composite materials, progressing to detailed discussions on reinforcements, polymers, and innovative manufacturing techniques. It addresses characterization of these composites, environmental considerations, design and analysis, joining and repair, and their durability and performance. Each chapter contributes to a deeper understanding, from basic principles to sophisticated real-world applications. It is a valuable reference for researchers, material scientists, engineers, polymer chemists, and manufacturers invested in sustainable polymer composite materials.

QUANTUM DOT NANOCARRIERS FOR DRUG DELIVERY

Editors: Prashant Kesharwani, Surender Singh (Elsevier)
1st edition, 2025, 518 pages, 225.99 EUR
ISBN 9780443240645
ISBN 9780443240652 (eBook)

The book compiles the latest advances in the development and application of QD nanocarriers for delivery of a range of therapeutic agents. QDs are widely accepted because of their dominant striking characteristics including biocompatibility, photoluminescence, morphology, size, and stability. This book systematically reviews the benefits and challenges of using QDs in drug delivery applications, evaluating their toxicity, safety, preclinical and clinical aspects. It should be a point of interest to a broad audience, including researchers and academics working in the fields of biomaterials, nanotechnology, pharmaceutical science and biomedical engineering.

FATIGUE IN COMPOSITES
Science, Damage Mechanics, and Design Applications

Editor: Marino Quaresimin
2nd edition, 2025, 728 pages, 305.00 EUR
ISBN 9780128212882
ISBN 9780128212899 (eBook)

Second Edition of this book provides an authoritative review of the current knowledge on the fatigue behavior of polymeric composites. It covers, in detail, a wide range of different problems encountered by designers in the automotive, marine, and structural engineering industries. Divided over three sections, the first section of chapters is designed to illustrate the advances in the investigation methodologies and the response of different composites under cyclic loadings, with special emphasis on damage mechanisms. The second section presents more advanced topics, such as the response of materials under in-service or extreme conditions, as well as theoretical developments and damage-based modeling approaches. In the third and final section, industrial cases and applications in different fields of engineering are discussed.

Leading scientists from academia and industry have prepared the different chapters. Particular care has been devoted to coordinating the content, style, and philosophy behind the various chapters with the central aim to provide a consistent and coherent approach. Several new topics have been included that were not available in the first edition, in view of the recent advances, such as the availability of new investigation techniques and the development of new areas of activity. Particular emphasis has been given to the damage mechanics of composites subjected to fatigue loading, which is discussed from several different points of view: experimental investigation techniques, modeling approaches, and damage-based design procedures. Several other innovative topics include certification issues, the effects of processing and manufacturing-induced defects on the fatigue response, and structural health monitoring strategies and methods. This book is an essential reference resource for academic and industrial researchers, materials scientists, and engineers working on the design, analysis, and manufacture of composite material systems in various industrial sectors, including aerospace, automotive, marine, offshore, civil, and space.

NANOGELS
Fundamentals to Pharmaceutical and Biomedical Applications

Editors: Anurag Kumar Singh, Vivek Chaturvedi, Santosh Kumar Singh, Jay Singh (Elsevier)
1st edition, 2025, 487 pages, 225.99 EUR

ISBN 9780443300165
ISBN 9780443300172 (eBook)

The book provides a comprehensive overview of nanogels, focusing on design principles, crosslinking methods, and therapeutic agent delivery. It covers nanogels' thermal properties, stabilization, chemical modifications, and biocompatibility. The book details biomedical applications, including bioimaging, sensing, drug delivery, and tissue engineering. It also explores in-vivo assessments, responsive therapies, and safety considerations, including toxicity, clearance mechanisms, and immunological responses, offering new insights into nanogel technology. This publication offers an exciting look into this emerging area and is of particular interest to healthcare professionals and researchers working on nanocarrier-based drug delivery, focusing on porous nanogel nanocarriers.

LAYERED MATERIALS IN PHOTOCATALYSIS
Environmental Purification and Energy Conversion
Editors: Liqun Ye, Dehua Xia (Wiley)
1st edition, 2025, 352 pages, 133.99 EUR
ISBN 978-3-527-35277-7
ISBN 978-3-527-84397-8 (eBook)

Photocatalysis, which modifies the rate of reactions stimulated by light absorption, can be a critical component of many catalytic processes. Layered structures can be used in photocatalysis to broaden surface area and generate more numerous reaction sites, which can in turn increase both photocatalytic activity and quantum efficiency. In recent years these layered materials have generated numerous applications in energy production and environmental chemistry. This publication introduces these materials, their historical development, and their key properties. Analyzing all major classifications of layered photocatalysts, it details their key environmental and energy applications and offers predictions for future research and development. The result is a crucial volume summarizing a growing technology. This book will be ideal for catalytic chemists, photochemists, and any other scientists working with catalytic or energy-generating processes.

GRAPHENE FROM NATURAL SOURCES
Synthesis, Characterization, and Applications
Editors: Amir Al-Ahmed, Inamuddin (CRC Press)
1st edition, 2025, 236 pages, 64.99 GBP
ISBN 9780367770938
ISBN 9781003169741 (eBook)

This book examines the synthesis of graphene obtained from different natural raw materials and waste products as a low-cost, environmentally friendly alternative that delivers a quality final product. Expert researchers review potential sources of natural raw materials and waste products, methods or characterization, graphene synthesis considerations, and important applications. Authors explores the different approaches to the synthesis of graphene oxide (GO) and reduced graphene oxide (rGO) from natural and industrial carbonaceous wastes. This publication outlines the modification and characterization methods of GO and rGO, also addresses the characterization methods of GO and rGO. It details applications of GO and rGO created from natural sources Graphene is a multidisciplinary material with applications in almost every sector of science and engineering. The book is a noteworthy reference for material scientists and engineers in academia and industry interested in reducing costs and employing green synthesis methods in their work.

ELECTROSPUN NANOFIBRES
Materials, Methods, and Applications
Editors: Chandrasekar Muthukumar, Senthilkumar Krishnasamy, Senthil Muthu Kumar Thiagamani, Mariyappan Shanmugam (CRC Press)
1st edition, 2025, 314 pages, 49.99 GBP
ISBN 9781032367989
ISBN 9781003333814 (eBook)

Electrospinning is a versatile method to synthesize fiber materials. Authors of this book explores the technical aspects of electrospinning methods used to derive a wide range of functional fiber materials and their applications in various technical sectors. As electrospinning is a process that can be modified strategically to achieve different fibers of interest, this book covers the wide spectrum of electrospinning methodologies, such as coaxial, triaxial, emulsion, suspension, electrolyte and gas-assisted spinning processes. It also discusses a broad range of materials, including synthetic polymers, biodegradable polymers, metals and their oxides, hybrid materials, nonpolymers, and more. Readers can find here reviews of different electrospinning methods and combined technologies. Authors describes process-related parameters and their influence on material properties and performance. Also, they examine modeling of the electrospinning process with highlighting the applications across different industries. This book is aimed at researchers, professionals, and advanced students in materials science and engineering.

M.Sc. Mateusz Borkowski

Guide for Authors

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Abstract

Abstracts in both English and Polish (up to 500 characters) shall include basic information concerning the content of the paper.

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In the paper there shall be used SI units. Polymer names should be substituted with international letter symbols, explained after the first usage.

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Tables, marked with consecutive numerals, shall be placed in the text of article.

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Mathematical equations (prepared using MS Word equation editor) marked with consecutive Arabic numerals, shall be placed in the text, each in a new line. Symbols used in equations should have the same size and style as the surrounding text.

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Chemical formulas and equations shall be marked with consecutive Latin letters (*e.g.* Scheme A). They shall be written with ChemWin program, Palatino Linotype font, 9 pt, in sub/superscripts 7 pt, bonds 2 mm long).

If the equation breadth exceeds the column breadth (8.8 cm) it shall be broken into separate lines at the arrow or plus character and equations impossible to break shall be drawn through both columns (max. 17.6 cm). Line spacing shall be 4 mm.

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Figures (schemes, photographs and graphs)

Width of figures shall not exceed 8.6 cm and only in justified cases – 17.2 cm. They shall be embedded in Word documents in the text of the article and send in separte files in original format (preferred formats: *Excel*, *CorelDraw X5* or lower, *Adobe Illustrator, EPS*).

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[Item No] Family name of the 1st author, given name initials with dots, family name of the 2nd author, given name initials with dots etc.: *abbreviated magazine name according to CAS Source Index* **year of issue**, *volume No*, page No (optionally, comma separated, DOI No, if it was assigned). *Example*:

[1] Gaina C., Gaina V., Sara M. *et al.*: *Journal of Macromolecular Science, Part A. Pure and Applied Chemistry* **1996**, *33(11)*, 1755.
https://doi.org/10.1080/10601329608010939

[2] Krijgsman J., Feijen J., Gaymans R. J.: *Polymer* **2004**, *45(13)*, 4677.
https://doi.org/10.1016/j.polymer.2004.04.038

[3] Nam Ch.K., Yong T.K., Sung W.N. *et al.*: *Polymer Bulletin* **2013**, *70*, 23.
https://doi.org/10.1007/s00289-012-0816-9

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[Item No] Family name of the 1st author, given name initials with dots, Family name of the 2nd author, given name initials with dots etc.: "Full title of the book in the original language" (1st editor family name, given name initials, 2nd editor family name, given name initials etc.) publisher, place and year of issue, page number. *Example*:

[1] Lenz R: "Organic chemistry of synthetic high polymers", Interscience Publishers, John Wiley and Sons, New York, London, Sydney 1967, p. 742.

A patent or patent application

[Item No] *Pat. Abbreviated country name* Number (year). *Example*:

[1] *Pat. Jap.* 1 135 663 (1989).

[2] *Pat. Appl. Pol.* 393 092 (2010).

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[1] Kapelski D., Slusarek B., Jankowski B. *et al.*: "Powder magnetic circuits in electric machines", Materials from 14th International Conference on Advances in Materials and Processing Technologies, Istanbul, Turkey, June 13—16, 2011, p. 43.

Web sites

[Item No]Web address (access date dd.mm.yyyy)

Example:

[1] http://www.sigmaaldrich.com/catalog/product/aldrich/94829?Lang=pl&version=PL (access date 12.11.2013)

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