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Graphene material from Olomouc moves towards market via Atomiver spin-out

Olomouc (16th December 2024) – **A graphene material for energy storage in supercapacitors, developed by scientists at the Czech Advanced Technology and Research Institute (CATRIN) of Palacký University Olomouc, is moving closer to real-world applications. This advancement is thanks to Atomiver, a newly established spin-out company, which aims to refine the carbon material into a market-ready product and explore its commercial potential. The material is already secured by a Japanese patent, with additional patents in progress.**

An electrode material based on nitrogen-enriched graphene—a two-dimensional material composed of a single layer of carbon—was created by researchers in Olomouc seven years ago. Over the following years, its significant potential for electrical energy storage, particularly in supercapacitors, was confirmed. Supercapacitors offer a compelling alternative to widely used lithium-ion batteries. CATRIN researchers have since worked on developing a prototype device with unique properties as part of the prestigious TRANS2DCHEM project, funded by the European Innovation Council. This effort involved collaboration with Bar-Ilan University in Israel and the Italian company ITELCOND. Establishing Atomiver was the next logical step in the material's journey toward commercialization.

“Given the excellent properties of our material, we decided to advance to the next phase of commercialization. Our goal is to produce nitrogen-doped graphene in bulk without compromising its quality and integrate it into supercapacitors designed for the target market. At a time of growing global energy demand and increasing need for efficient and stable energy storage solutions, our electrode material holds great promise,” said Michal Otyepka, co-author of the technology and co-owner of the spin-out. Supercapacitors incorporating this material may one day support critical applications such as ensuring the safe operation of large data centers, IoT networks, transportation systems, energy grids, space electronics, and even implanted medical devices.

The current gold standard for energy storage—rechargeable lithium-ion batteries—faces limitations in power density and safety in some applications. In contrast, the Olomouc team has developed a safe electrode material offering unprecedented energy and power density. In laboratory tests, supercapacitors using this material achieved energy density of up to 200 Wh/L and demonstrated exceptional performance potential in power density of up to 52 kW/L, far surpassing existing technologies. “Boosting the energy density of supercapacitors beyond 40 Wh/L represents a major technological breakthrough, enabling broader applications requiring high performance,” Otyepka added.

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Recently, Atomiver signed a licensing agreement with Palacký University, granting the company rights to utilize the university's know-how in return for compensation. “Spin-out companies are critical for transforming unique ideas into market-ready technologies. They guide innovations through the incubation phase, where the technology is rigorously tested in the market and refined into a competitive product. This process, which demands speed and intensive communication with commercial partners, is challenging within an academic environment,” explained Jiří Navrátil from the CATRIN Technology Transfer Office. Translating research into practical applications is a cornerstone of CATRIN’s mission, alongside high-quality research, interdisciplinary collaboration, and international partnerships.

“The CATRIN team has built an exceptional technological foundation, and Atomiver’s mission is to carry this research forward to commercialization. It is a privilege to lead this project as we transition from research to product. We’ve already received strong interest from commercial partners, and our immediate goals include closing the first investment round and establishing a robust supply chain within the European Union,” said Andrew Hladký, CEO of Atomiver.

The significance and potential impact of the technology are underscored by Atomiver's acceptance into the NATO DIANA acceleration programme, which selected only 74 companies out of more than 2,600 applicants. CzechInvest has also supported Atomiver through the Technology Incubation program, providing further funding for its development.

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