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Arkema, the CNRS, Université Claude Bernard Lyon 1 and CPE Lyon partner to design the batteries of the future

- Improving performance in the materials that compose lithium-ion or lithium-sulfur batteries is a high priority for portable energy needs.
- Arkema, the CNRS, University Claude Bernard Lyon 1 and CPE Lyon have pooled their expertise to design new high-performing materials for the batteries of the future.

A growing share of portable energy needs will be provided by mobile energy storage devices, such as lithium-ion batteries. Arkema, the CNRS, Université Claude Bernard Lyon 1 and CPE Lyon have created iHub Poly-9. This joint laboratory will focus on the design of new high-performance materials made of fluorinated polymers, for next generation battery technologies.

With electric cars, smartphones and laptop computers, the need for portable energy storage devices never ceases to increase. This demand is often met by lithium-ion batteries. They are composed of two electrodes and a separator that keeps them apart, all immersed in an electrolyte. Various fluoropolymers, a family of molecules to which KYNAR® polyvinylidene fluoride (PVDF) belongs, offer excellent cost-performance ratios as cathode binders and separator coatings, thereby improving battery energy density, power, storage capacity, shelf life, reliability, and more.

For over 30 years, the Catalyse, polymérisation, procédés et matériaux (CP2M, CNRS/CPE Lyon/Université Claude Bernard Lyon 1) research laboratory has been investigating polymers made under high pressure, with a focus on fluorinated polymers for over ten years. This led to the partnership today between Arkema, the CNRS, University Claude Bernard Lyon 1 and CPE Lyon, in a new joint laboratory: iHub Poly-9. This laboratory works in partnership with the newly created Arkema battery Centre of Excellence at the Pierre Bénite site.

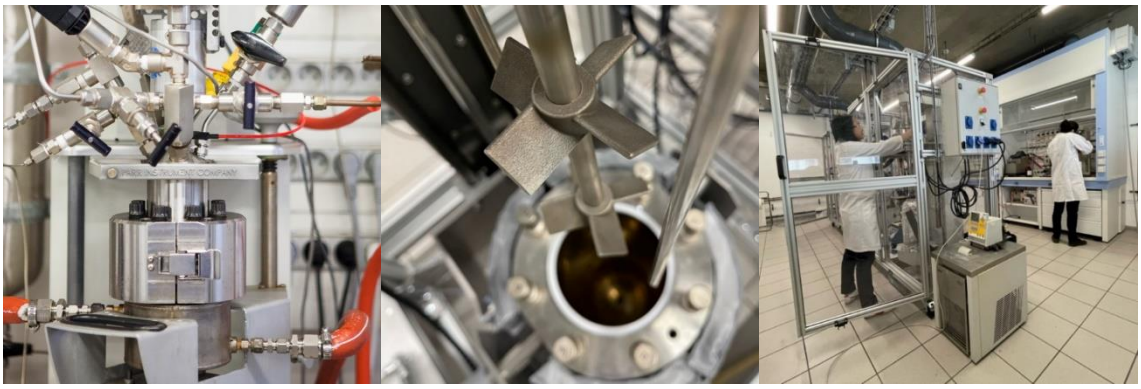
"*I look forward to working more closely with Arkema, to add further to our long history of cooperation. We are continuing a policy of developing joint laboratories with companies of all sizes, as confirmed by the more than 200 joint laboratories already existing. This ambitious form of collaboration between the business world and the academic world relies on fundamental research to solve major industrial challenges*," says Antoine Petit, CNRS Chairman and CEO.

"*This laboratory is another joint initiative in the long collaboration between Arkema and the CNRS. It is a perfect example of Arkema's ongoing approach to open innovation and partnerships with the academic world. This is how we can support our research on the best ways to develop sustainable and high-performance*

materials in strategic areas, such as batteries and hydrogen", adds Armand Ajdari, Director of Research and Development at Arkema.

The scientists involved are particularly interested in polyvinylidene fluoride and its copolymers. This family of polymers is extremely stable chemically and electrochemically. Their synthesis, which occurs in an aqueous dispersion, requires high pressures sometimes exceeding 100 bars, and CP2M has reactors capable of achieving these pressures safely.

The collaboration with Arkema includes support for five doctoral students who will study the synthesis and design of fluorinated polymers for the energy industry, including one PhD thesis funded by Auvergne Rhône Alpes and three CIFRE PhD theses funded by the company. Additionally, Arkema will purchase the equipment for a 50 m^2 laboratory dedicated exclusively to iHub Poly-9 within the CP2M premises.



The reactor that can conduct polymerization at 80 bars. © Timothy McKenna.

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