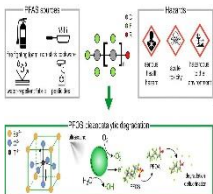


Innovation Brief

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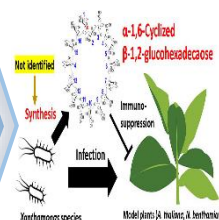
New method to break down forever chemicals uses nanoparticles and ultrasound

Researchers at ETH Zurich's Institute of Robotics and Intelligent Systems, have developed a new method to break down a subgroup of PFAS called perfluorooctane sulfonates, or PFOS, using piezocatalysis. "Piezo" refers to piezoelectricity, an electrical charge that is generated during mechanical deformation, and "catalysis" means accelerating a chemical reaction with suitable substances.



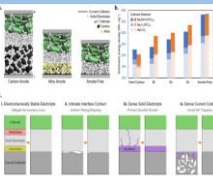
Breakthrough in plant disease: New enzyme could lead to anti-bacterial pesticides

Scientists uncover a pivotal enzyme and its critical role in synthesizing a key compound used by Xanthomonas pathogens to enhance their virulence against plants. This breakthrough opens new avenues for developing targeted pesticides that combat plant diseases without harming beneficial organisms. Insights into the enzyme's mechanism and optimal conditions offer promising prospects for sustainable agriculture, bolstering crop resilience and global food security while minimizing environmental impact.



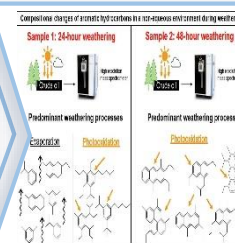
A breakthrough in inexpensive, clean, fast-charging batteries

Scientists at the Laboratory for Energy Storage and Conversion have created an anode-free sodium solid-state battery. This brings the reality of inexpensive, fast-charging, high-capacity batteries for electric vehicles and grid storage closer than ever.



Using high resolution mass spectrometry to study fuel chemistry

Researchers have developed new analytical methods to rapidly analyze fuels and complex petroleum products by using high-resolution mass spectrometry. The approaches they utilized enable highly detailed qualitative analysis of complex mixtures in minutes. One of several methods recently published in *Fuel* facilitated the investigation of chemical changes that occurred in weathered crude oil in terrestrial environments.



Chemical plastics recycling is ready to go: Researchers show that it's all about the stirring

Researchers at ETH Zurich have laid down foundations in developing chemical recycling processes that can give plastic waste a second life as petrol, jet fuel or engine oil. The researchers successfully developed a mathematical formula to describe the entire chemical recycling process with all its parameters, allowing researchers in the field to precisely calculate the effect of the stirrer's geometry and speed when processing molten plastic waste.



New filter removes chemical contaminants from water even at very low concentrations

A team of researchers have developed a new method for removing harmful chemicals from water. The new approach uses a polymer membrane that houses an interconnected network of pores constructed from metal-organic polyhedra, which are like tiny cages to filter and capture the targeted chemical molecules. The new membrane materials they developed can simultaneously detect and remove trace-level pollutants.

