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Chemistry revisited: value from sustainable chemical technologies

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Abstract:

The rise in population levels triggers challenges that need to be addressed if sustainable growth is to be achieved. Targeting a low-carbon, resource-efficient and circular economy requires multi-level and cross-disciplinary partnerships and identifying fields in which immediate action is needed. Chemistry has fueled progress of mankind for centuries, making life more comfortable, healthier, and easier. All of this however uses energy and raw materials, which inevitably puts a strain on the environment. Sustainable development requires that we look at chemistry in a different way - facilitating the application of new raw materials, which are environmentally friendly and can easily be replenished. It also relies on a shift in the way we source and use the energy for production of materials. This global transformation requires constant innovation and new technologies, but also support of all stakeholders - from academy, industry, policy-makers and society.

VTT Technical Centre of Finland actively participates in all areas of sustainable development, with a special focus on climate action, resource sufficiency, safety and security, increasing quality of life and industrial renewal. Sustainable chemistry is the core enabler in many of these activities. From design, through chemical and materials development to scale up and testing in pilot facilities - VTT works towards creating business opportunities from new technologies. The presentation will highlight some of the most exciting developments related to creating value from sustainable chemical technologies - from new bio-based monomers, bio-oils and biofuels, evaluating waste streams as new raw materials sources, carbon capture and reuse, through lignin-based high value products, bio-based packaging and thermoplastic cellulose.



Tuulamari Helaja graduated with a Ph.D. in Chemistry from the University of Helsinki in 2000. Following a post-doctoral fellowship at the University of Münster in 2000-2001, she joined Borealis Polymers to work with olefin polymerization catalyst technologies. In 2006, she obtained an eMBA from Aalto University and joined VTT, where she has held various positions. Since 2016 she has been the Vice President for the Sustainable Energy and Chemical Technologies research area covering thermochemical conversions and chemical process technologies incl. scale-up, industrial synthesis and catalysis, polymer and plastic processing, metals and materials recovery, and computational chemistry incl. process concepts and models.