9th World Congress on **Biopolymers & Bioplastics**

August 26-27, 2019 | London, UK

Mikael S. Hedenqvist

KTH Royal Institute of Technology,Sweden

Protein plastics

In this presentation the possibilities and challenges associated with the use of protein-based materials in applications where petroleum-based plastics are used today. The processability of protein-based materials using techniques currently used for petroleum-based plastics (e.g. injection moulding, compression moulding and extrusion) will be discussed as well as the properties of the final products. Examples will be given for proteins (one-component materials and blends) that we work on or have worked on. These include wheat gluten, rape-seed, whey and potato protein materials. Also the processing and properties of non-food proteins will be presented. The protein structure and the physical and chemical properties of the protein materials are assessed using e.g. SE-HPLC, DSC, TGA, infrared spectroscopy and mechanical tests. The properties of films, plates, 3D-shaped items and foams will be given and discussed. The materials are either rubbery (plasticised) or glassy, showing everything from soft/resilient to stiff behaviour. Some special features, obtained with the use of additives (e.g. biochar, graphene and carbon nanotubes) and/or special processing techniques, are highlighted, such as fire-retardancy, liquid absorption and electric properties. Moisture and microbial resistance, obtained by e.g. coatings and antimicrobial agents, are highlighted and expected life-times in various environments are also discussed. The work have been performed in collaboration with Dep. of Plant Breeding/Dep. of Molecular Sciences/Swedish University of Agricultural Sciences, Rice Bioeconomy, Risø National Laboratory for Sustainable Energy/Technical University of Denmark, MAX IV Laboratory/Lund University, Deutsches Elektronen-Synchrotron/Hamburg, Dep. of Chemistry/Dep. of Materials Science and Engineering/KTH, Centre for Advanced Composite Materials/Dep. of Mechanical Engineering/ Dep. of Chemical and Materials Engineering/University of Auckland, Dep. of Mechanical and Aerospace Engineering/ Dep. of Chemical Engineering/Monash Universit.

Biography

Mikael S. Hedenqvist is professor and leading the division of Polymeric Materials at KTH Royal Institute of Technology, Stockholm, Sweden. He received his Ph.D. from KTH 1995 and was a postdoctoral scholar at the University of Utah, USA, in the group of Professor Richard Boyd. He is editor of Polymer Testing. His research involves both petroleum- and biobased polymers (including starch and protein materials) and the following topics; electrical and transport properties, polymer stability and degradation, packagings, composites, foams, modelling at different length scales and polymer processing.

mikaelhe@kth.se