

EUROMAT 2019 / Bio-based materials

SYMPOSIUM: I6

Title: Synthetic biology towards novel bio-based materials		
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Abstract		
<p>The sustainable production of advanced materials with high performance is possible through the use of renewable resources such as inexpensive biological feedstocks. These often derive from waste generated by the agricultural and forestry sectors. The extraction, modification, and functionalization of polymeric components of biomass represent an important area in biomaterials research.</p> <p>At the same time, the frontline in green chemistry constitutes the use of enzymes and cells for the manufacturing of sustainable platform chemicals and value added synthons. The tremendous development in high-throughput genome sequencing and bioinformatics tools has enabled the discovery and generation of biocatalysts that are capable of performing challenging reactions that would be difficult to achieve by traditional synthetic chemistry. Today, it is even possible to generate biocatalytic reactions that are “new to nature”. Synthetic biology is an approach where natural biological systems are redesigned, or entirely new pathways are created, to engineer a host organism to produce useful molecules or materials. There is a huge untapped potential to apply synthetic biology to the field of polymer chemistry, ranging from enzyme-catalyzed generation of novel green monomers to biocatalytic polymerization.</p> <p>This session will highlight recent developments in the use of biocatalytic cascade reactions to upcycle inert building blocks from renewable sources, including hemicelluloses and terpenes, into activated monomers amenable for polymerization. The high potential of capitalizing on diverse enzyme mechanisms and pathways, including trans-acylation and radical, will be covered. We will also highlight examples of advanced biomimetic materials produced from waste biomass, and showcase the burgeoning field of synthetic biology for biomaterials production.</p> <p>Targeted topics of the session:</p> <ul style="list-style-type: none">*State-of-the-art in enzyme cascades for one-pot monomer biosynthesis of functionalized furans and terpenes*Enzyme-catalyzed polymerization*Biological and biomimetic materials with high performance and novel properties*Microbial pathway engineering for the production of advanced biomaterials		

