Abstract Bio-Acrylates

Bio-acrylates from biomass via polymeric 3-hydroxypropionic acid, full cSBO with a proposed starting date on 1 January 2022 and a proposed duration of 48 months, with research partners UGent, BBEPP and KU Leuven.

Acrylic acid and its alkyl esters are commodity building blocks used for the production of various polymers with applications in a large variety of high-performance products such as coatings, paints, adhesives, ion-exchange resins, detergents, fibres, superabsorbent polymers (SAP), and dispersants. Acrylics are one of the most versatile monomers in the chemical industry with a worldwide demand of about 6.3 Mtons in 2020 and an expected growth of 4.7% CAGR in the coming years. Currently, almost all acrylic acid is produced from petroleum based propylene by a two-step gas-phase oxidation process with 95% propylene conversion and high acrylic acid selectivity. The CO_2 footprint of this fossil-based process is estimated as 2.5 kg CO_2 per kg of acrylic acid produced. In view of the large production and use of acrylic acid and derivatives in Flanders, more sustainable production routes for acrylic acid are a prime target for reducing the carbon footprint of Flanders.

The Bio-Acrylates project will develop a new production process for **biobased Acrylic Acid** (bio-AA) by fermentative conversion of waste biomass into **poly-3-hydroxypropionic acid**, followed by the hydrolysis of the polymer into **3-hydroxypropionic acid** that can be readily dehydrated to bio-AA with high yields and selectivity. By using waste biomass, a renewable resource obtained through the uptake of CO_2 from the atmosphere, near zero carbon emission processes can be envisaged. Overall, this process offers many advantages compared to the direct production of 3-hydroxypropionic acid.

For substantive questions about this project proposal, please contact MOT1 representative Isabelle Monnaie (imonnaie@catalisti.be; +32 471 506 833).