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Polymer-Biopolymer Chemistry

March 18-19, 2019 | Amsterdam, Netherlands

THE FUTURE OF PLASTICS. QUO VADIS ?

In the transition to a sustainable, circular economy, a lot of effort is directed to produce bio-based versions of molecules that we already use today (drop-in) such as bio-based ethylene and para-xylene (terephthalic acid). As an alternative, should we make use of the structure already present in carbohydrates when developing new monomers? FDCA (furan dicarboxylic acid) is such an example.

Recently the environmental issues with plastics have received a lot of attention. In view of the origin of ocean plastics, the EU has recently proposed a future ban on single-use plastics. This will mean that re-use will be a very important theme in the coming years/decades. Re-use means cleaning/washing of used plastics such as bottles. For sustainable cleaning, a high Tg (>85°C) is required. High Tg polyesters fulfill most of the requirements to become re-usable, high performance materials for bottles/films and fibers.

Biography

Gert-Jan (1963) has a background in Polymer Chemistry (DSM 1993-2000) and has been Professor of Polymer Catalysis at Eindhoven University of Technology (1999-2006). In 2000 Gert-Jan transferred to Avantium and in 2004 he was appointed as CTO. He initiated the YXYtechnology which includes novel processes from carbohydrates to monomers such as FDCA and 100% bio-based polyesters such as PEF for bottles, fibers and film. At Avantium, Gert-Jan is currently involved in the development of lignocellulosic glucose (2nd generation sugars), the direct selective hydrogenolysis of carbohydrates to ethylene glycol and the electrochemical reduction of CO₂ to building blocks such as oxalic acid. At the UvA Gert-Jan heads the Industrial Sustainable Chemistry Group in which novel sustainable bio-based plastic materials are developed. Jan is currently part-time professor Industrial Sustainable Chemistry at the UvA where he is working on novel sustainable materials with a team of 8 PhD students

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