Organized by Endorsed by
8th IUPAC INTERNATIONAL CONFERENCE ON GREEN CHEMISTRY
9 - 14 September 2018, Shangri-La Hotel, Bangkok, Thailand

8th ICGC 2018 Session:

The Opportunity of Sustainable Materials

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Abstract:
"There is no doubt in my mind that we can only start to change our way of producing and using energy and resources if we develop alternatives that can compete with today's ways on cost, performance and sustainability." There is great opportunity in the projected growth of the worldwide plastic production volume from 325 today to 1100 billion tons in 2050. To make an impact in 2050, these new materials must be identified NOW to enable this transition.
In this transition, bio-based versions are developed of molecules that we already use today (drop-in) such as bio ethylene and para-xylene (terephthalic acid). But does it make sense to produce hydrocarbons such as p-xylene (C8; no oxygen) from glucose (C6; more than half its mass oxygen)? 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.
In the lecture, the pro's and con's of 'drop-in' versus 'new' will be discussed by evaluating the main routes to bio-PET and to its alternative bio-PEF by zooming in on process economics and new and improved properties, the required product development and other challenges.

Gert-Jan (1963) has a background in Polymer Chemistry at DSM and was Professor of Polymer Catalysis at Eindhoven University of Technology.
As CTO of Avantium he developed novel processes for monomers such as FDCA and PEF polyester for bottles, fibers and film. He works on lignocellulosic glucose (2nd generation sugars), on bio ethylene glycol and on the electrochemical reduction of CO_2 to chemical building blocks.
Gert-Jan is inventor on more than 100 patent applications; he was elected "2014 European CTO of the year" and nominated for European inventor of the year in 2017. Gert-Jan is currently also professor **Industrial Sustainable Chemistry** at the University of Amsterdam where he is working on novel sustainable materials and microplastics in the environment.