COSMOS
ADDING VALUE TO CAMELINA AND CRAMBE OIL

Press release

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A new class of olefin metathesis catalysts developed

Apeiron Synthesis, research partner in the COSMOS project, has developed a new class of olefin metathesis catalysts. These catalysts proved to be extremely effective in the formation of both terminal and internal C=C bonds. The results of this research have recently been published in Angewandte Chemie and awarded with a cover picture (http://onlinelibrary.wiley.com/doi/10.1002/anie.201609009/full).

The European research project COSMOS aims at reducing the dependence of the European oleochemical industry on tropical oils as the source for medium-chain fatty acids (MCFA) by developing the domestic oil crops camelina and crambe. In the framework of this project, researchers at Apeiron Synthesis, a Polish chemical company (SME), have developed a new class of olefin metathesis catalysts: bis(cyclic alkyl amino carbene)ruthenium indenylidene complexes.

Apeiron's goal is to commercialize the metathesis reaction by introducing various kinds of dedicated catalysts that may find applications in the production of high-value speciality chemicals (e.g. drugs, cosmetics, pesticides, etc.) and advanced polymers with the use of metathesis. Apeiron designs, produces and sells various kinds of metathesis catalysts (from mg to kilogram quantities) to academia and chemical companies.

One of the members of the newly developed class of catalysts proved to be extremely versatile and may be used with success in virtually all metathetic transformations leading to terminal and internal olefins from ethenolysis; ring closing metathesis (including challenging macrocyclization), cross metathesis (involving electron deficient partners like acrylates) to ene-yne metathesis. All those transformations are possible with exceptionally low catalyst loadings. In case of self-metathesis of 1-decene turnover number over 300,000 was obtained.

Until this discovery, the state-of-the-art in olefin metathesis has been the application of N-heterocyclic carbene (NHC) containing ruthenium alkylidenes for the formation of internal C=C bonds and of cyclic alkyl amino carbene (CAAC) containing ruthenium benzylidenes in the production of terminal olefins. As such, the new catalysts combine the scope previously shared between these two catalyst families.

Project partners

The project comprises eighteen partners, of which 50% are SMEs and large enterprises and

the remaining 50% are universities and research institutes. The research consortium is being managed by Wageningen Food & Biobased Research.

Institutes and universities include Alma Mater Studiorum – Università di Bologna (Italy), Ernst-Moritz-Arndt-Universität Greifswald (Germany), Uniwersytet Warminsko--Mazurski w Olsztynie (Poland), Wageningen University, Stichting Wageningen Research (The Netherlands), Université de Rennes 1 (France), Centre for Physical Sciences and Technology (Lithuania), Centre for Renewable Energy Sources and Saving (Greece) and Imperial College of Science, Technology and Medicine (UK).

Companies include Enzymicals AG, Institut für Energie- und Umweltforschung Heidelberg GmbH and nova-Institut für Politische und Ökologische Innovation GmbH from Germany, InCatT B.V. (a spin-off company of the University of Amsterdam), Proti-Farm R&D B.V. and Linnaeus Plant Sciences B.V. from the Netherlands, Solutex GC, S.L. from Spain, Apeiron Synthesis from Poland and Arkema from France.

For more information on the COSMOS project please visit www.cosmos-h2020.eu.

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