

# Foam reactor is 10 times more energy efficient

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There is considerable worldwide demand for new types of reactors for the rapid and well- controlled production of high value chemicals. Charl Stemmet has developed the porous foam reactor, which has an energy efficiency ten times higher than traditional reactors at comparable production rates. Industrial partners such as BASF, DSM and Shell will make use of the research results. The project was funded by Technology Foundation STW.

In this project, Charl Stemmet investigated a new, structured support for catalysts for use in gas-liquid reactors. He used a highly porous solid foam as the support material, having up to 97% open space available and a very large surface area per reactor volume. This large surface area is important for mass-transfer-limited, gas-liquid reactions; the larger the surface area, the greater the production per unit reactor volume.

To make a good reactor design with this new catalyst support, Stemmet first of all examined the flow behaviour of gas and liquid, and experimentally determined the design equations. He then compared the foam reactor with the current standard for gas-liquid reactions using a solid catalyst: a so-called packed bed of stacked catalyst particles.

The foam reactor has a volume 1.5 times larger than that of the packed bed for the same gas and liquid flows and the same production rate. However, the energy efficiency of the foam reactor is ten times higher than that of the packed bed. The results will be used by the industrial partners in this project: BASF Nederland B.V. (formerly Engelhard) , DSM Research B.V., Ecoceramics B.V., Lummus Technology (formerly ABB Lummus Global Inc.), Recemat B.V. and Shell Global Solutions International B.V.

Source: Netherlands Organization for Scientific Research

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