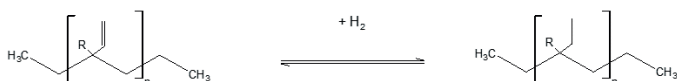


PROCESS DEVELOPMENT & PLANT CONCEPT

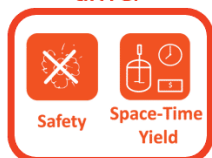
...FOR A CONTINUOUS HYDROGENATION PLANT

Hydrogenation of a polymer double bond

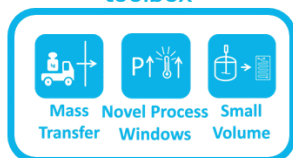


Similar Reaction	Residence Time	Conversion
Macro-Batch	5 hours	100%
Flow-Reactor	2 minutes	100%

driver



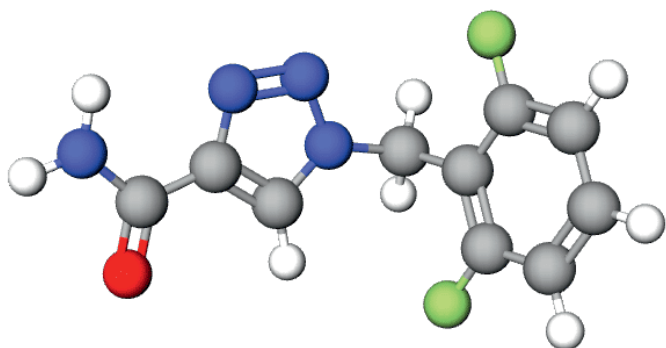
toolbox



Mobile and efficient hydrogenation is a well-known target. In a feasibility study, Microinnova demonstrated that compact plants for polymer hydrogenation are possible. The target was to develop a concept for a mobile hydrogenation plant with a manufacturing capacity of more than 1 ton per hour. Feasibility studies in our laboratories translated a process suitable for this kind of application. The key element to do this was the process intensification of the hydrogenation reaction. Our lab team was able to demonstrate a process with reaction times of minutes instead of hours, as is the case in conventional processes. The development team was very proud to have been able to present this success for viscous raw materials.

ENVIRONMENTAL & ECONOMIC IMPACT OF SOLVENT FREE CONTINUOUS API MANUFACTURE OF A RUFINAMIDE PRECURSOR

In the pharma and fine chemical industries, the development of continuous flow technologies is a process intensification step of primary importance for the manufacturing of high-quality products, while reducing negative ecological impact and cost of production. The sustainability and profitability of a process can be measured through life cycle assessment and cost evaluation. However, when applied to emerging technologies based on flow chemistry these need to be performed at different stages of the process development in order to limit the uncertainties arising from the scale-up. Hence, providing high-fidelity projections of ecological impact and costs at larger scales.



Therefore, we perform an assessment at two different scales of production (lab and mini pilot plant scale) with the aim of quantifying the uncertainties of the assessment related to the scale-up, identifying the hotspots of the system, and hence providing guidelines for further steps of process development. One such process that was successfully optimized using this process was the synthesis of Rufinamide. Importantly, in this case, the identification and implementation of effective solvent-free conditions was evaluated at a pilot scale for the first time.