# 3D printed Catalytic Static Mixers for Continuous Flow Organic Synthesis

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Abstract:

Flow chemistry has attracted major interest in the area of organic synthesis over the past decade because it embodies several principles of green chemistry and process intensification. In comparison to their homogeneous liquid phase counterparts, flow chemistry reactors for liquid-solid heterogeneous catalytic applications are more complex and specialised, which means their implementation in organic synthesis has not been as widespread and straight forward. In order to create a reactor device that combines the benefits of tubular flow reactors with 'easy to apply' and versatile catalytic materials, our group at CSIRO has developed a new reactor concept using so-called Catalytic Static Mixers (CSMs). These tubular inserts consist of a 3D printed static mixer scaffold coated with catalytic layers such as Ni, Pd or Pt. Tubular reactor devices have a series of advantages over classical packed bed reactors or batch slurry reactors, such as high L/D ratios leading to excellent process control, well defined flow paths and predictable and low pressure drops. A series of different hydrogenation reactions reducing alkenes, alkynes, carbonyls, nitro- and diazo-compounds, nitriles, imines, and halides were performed, as model examples for industrial applications in the pharmaceutical, fine chemistry, food or agrochemical sectors.

Biographical Statement of speaker:

Christian H. Hornung is a Senior Research Scientist at the CSIRO, which he joined in 2010, and the Director of FloWorks, CSIRO's Centre for Industrial Flow Chemistry. He received a Masters degree in Chemical Engineering from Friedrich-Alexander University in Erlangen, Germany in 2004 and his PhD in Chemical Engineering from Cambridge University, UK in 2008, where he worked in the groups of Prof. Malcolm R. Mackley and Prof. Steven V. Ley.

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