# Additive Manufacturing of Catalyst Supports for the Conversion of Biosourced Molecules

*Meryem MOUNAJ(1), Florian JEAN(1), Jérémy DHAINAUT(2), Yannick LORGOUILLOUX(1), Christian COURTOIS(1)*

(1) Univ. Polytechnique Hauts-de-France, INSA Hauts-de-France, CERAMATHS – Laboratoire de Matériaux Céramiques et de Mathématiques, F-59313 Valenciennes, France.
(2) Univ. Lille, CNRS, Centrale Lille, Univ. Artois, UMR 8181 – UCCS – Unité de Catalyse et Chimie du Solide, F-59000 Lille, France.

The aim of this study is to develop a novel manufacturing process for porous ceramic catalyst supports, such as alumina or zirconia, intended for use as catalyst supports in the conversion of biosourced molecules. Additive manufacturing, is employed in this investigation, utilizing the stereolithography (SLA) technique to produce objects with controlled geometry and optimal microstructure in terms of density, porosity, and specific surface area. The main challenge lies in controlling the sintering of objects to ensure overall cohesion without significantly compromising the specific surface area. Consequently, thermal treatments at various temperatures (from 900 to 1600°C in air) have been applied to the printed objects to achieve the best compromise between mechanical properties and final specific surface area. Once the optimized piece is shaped and sintered, an active phase in the form of a Brönsted acidity metal-organic framework (MOF) will be deposited to cover the entire external surface of the prepared ceramic support (Figure1). This active phase will be studied for its long-term stability. The objective of this study is to dehydrate fructose into 5-hydroxymethylfurfural (5-HMF) using these catalytic materials. This organic molecule has applications in various fields, including the food industry, pharmaceuticals, and biofuel production.

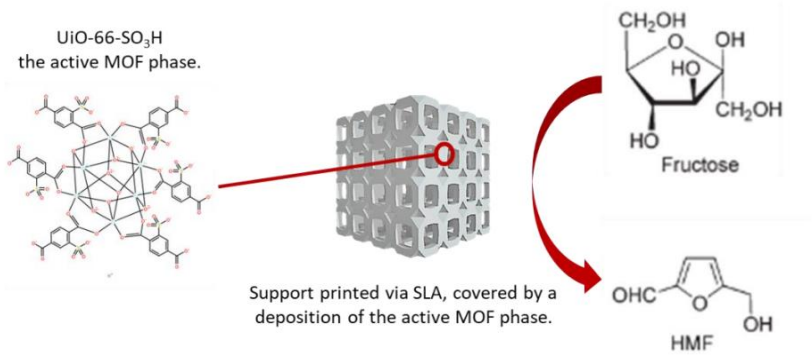


*Figure 1: Explanatory Diagram of Fructose Conversion to HMF in the Presence of Catalyst Support.*

Meryem MOUNAJ
Meryem.Mounaj@uphf.fr