3D-printed metal flow reactors; Design, Production & Applications

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Additive manufacturing (AM or 3D printing) of metal provides almost unlimited design freedom for new continuous reactor technologies, low material consumption, and rapid product development, while maintaining mechanical strength. The reactors and static mixers fabricated using AM exhibit very good heat transfer coefficients (1000-2000 W/m^2K), low pressure drops, and outputs in the range of 1- 15 L/hr.

The modularity of the designs allows swift set up of any desired experimental configuration, easily integrated with existing equipment (swage lock connectors). Temperature range is wide (-100°C to 300°C) and pressures up to 200 bars are allowed. The flexibility in design does allow to create the ideal asset for any demanding type of chemistry. Typical applications are the ones where hazardous reagents and exotherms would hamper batch operations: e.g low temperature organometallic reactions, nitrations, cyclopropanations, azide chemistry, and catalytic oxidations with air.
Recently, we have commissioned the mounting of this technology in ready made skids for low temperature Organometallic Chemistry. These Skids are fully automated and allow for safe and continuous production of multi kg's of product per hour.