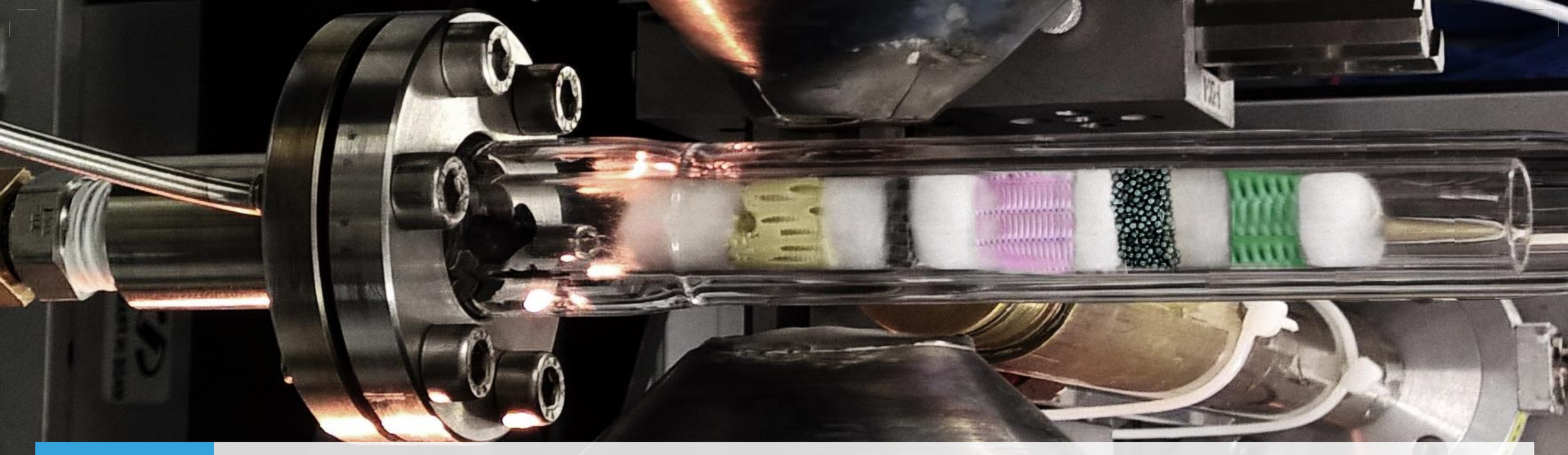


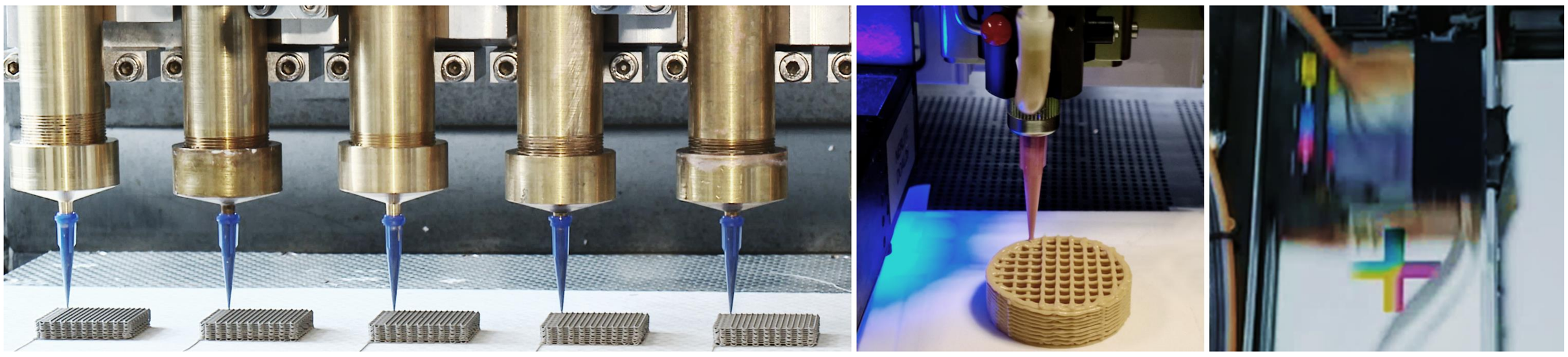
3D PRINTED SYSTEMS FOR CHEMISTRY AND ENERGY APPLICATIONS

Introduction

Major advantages of 'direct write' (structuring reactors and devices into multi-channel, multi-layer architectures) is that they allow for:

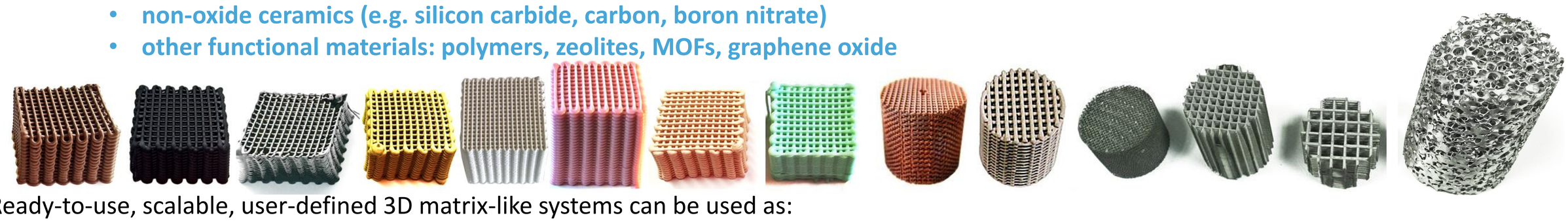
- **precise and uniform distribution of active material over a high surface area**
- **highly adaptable/tailor-made and well-controlled design for optimal flow pathways**
- **low pressure drop, improved mass- and heat-transfer**
- **easy (in-situ) regeneration and cost-effective product removal**
- **overall greatly improved productivity per cubic meter of reactor volume**

What do we offer?



By employing emerging 3D printing technologies (such as 3D fibre deposition, dispensing and binder jetting) we offer bespoke patterning of:

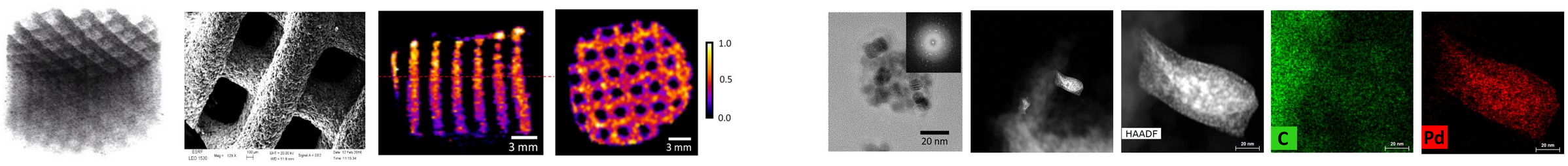
- **oxide ceramics (e.g. Al_2O_3, SiO_2, ZrO_2, multi-component metal oxides, nanocomposites)**
- **metals (e.g. titanium, copper, aluminium, silver) and alloys (e.g. stainless steel)**
- **non-oxide ceramics (e.g. silicon carbide, carbon, boron nitrate)**
- **other functional materials: polymers, zeolites, MOFs, graphene oxide**



Ready-to-use, scalable, user-defined 3D matrix-like systems can be used as:

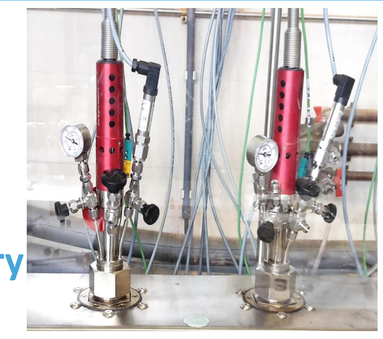
- **adsorbents for gas cleaning (separation, removal and recovery of CO_2, H_2S, H_2O, NOx, VOCs)**
- **catalysts for gas and liquid phase reactions (CO_2 utilisation, (de)hydrogenation, methanation, methane conversion,…)**
- **metal scavengers for flow through applications**
- **supports and carriers, electrodes for fuel reforming, electro-chemical cells, heat exchangers and (hollow fibre) cooling elements**

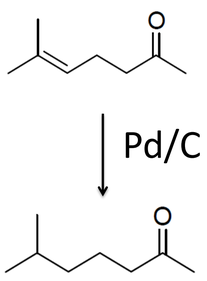
Advanced characterisation of microstructure and deposited material:

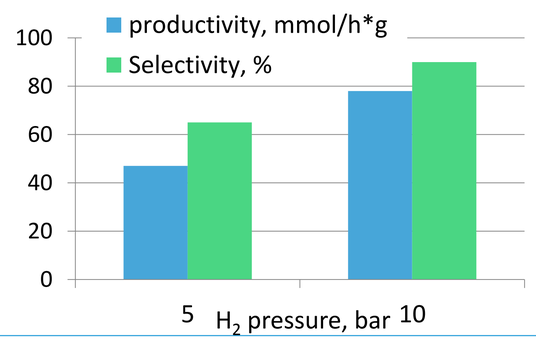


Who do we cater for?

- **Materials (catalyst and adsorbent) manufacturers**
- **Polymer processing industry**
- **Additive manufacturing industry**
- **Petrochemical sector and Fine and speciality chemistry**
- **Fuel cells and electrochemistry**







Calls of interest:

NMBP, FoF, SPIRE, SC3, SC5 …

- **DT-NMBP-19-2019: Advanced materials for additive manufacturing**
- **CE-NMBP-24-2018: Catalytic transformation of hydrocarbons**
- **LC-SC3-NZE-1-2018: Advanced CO_2 capture technologies**
- **CE-SC3-NZE-2-2018: Conversion of captured CO_2**

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