Advanced materials for additive manufacturing with applications in catalysis, antimicrobial and optoelectronics

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The development of materials with advanced functionalities is a cornerstone for the development of additive manufacturing technologies. Within this framework, polymers with ionic liquid units (PILs) and derived materials constitute a very interesting type of materials with a broad range of properties derived from molecular, supra- and macromolecular interactions, which can be finely tuned by design.[1,2] Such materials have demonstrated a wide array of applications, in fields including catalysis, energy, antimicrobials, etc. Furthermore, their tunable properties facilitate the stabilization of advanced molecular, nanostructured materials, enzymes, etc. Recently, these materials have been formulated for applications in additive manufacturing, including dynamic light projection (DLP), inkjet and stereolithography.

In this contribution, we will discuss our recent efforts to develop formulations with PILs for applications in CO_2 capture and valorization,[3] antimicrobials[4] and emerging applications in optical and electronic materials.[5]

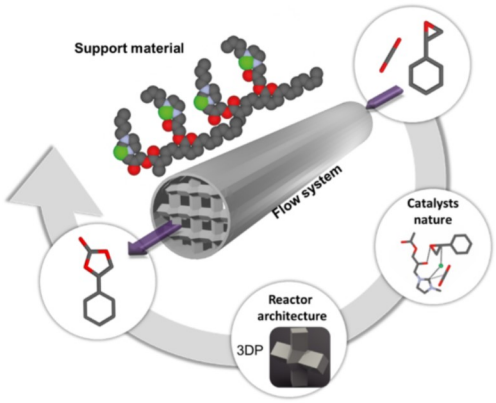

Figure 1. Conceptual schematic representation of the application of additively manufactured catalytic materials for the continuous-flow capture and transformation of CO_2 to cyclic carbonates under continuous-flow.[3]

[1] S.-Y. Zhang, *et al.*, *Chem. Soc. Rev.,* 49 (2020), 1726-1755.

[2] V. Sans, *et al.*, *Chem. Eur. J.* 17 (2011), 1894-1906.

[3] D. Valverde *et al.*, *Green Chem.* (2022), DOI: 10.1039/D1GC04593H

[4] D.J. Wales *et al.*, *Biomater. Sci.* (2021) 9, 5397-5406

[5] D.J. Wales *et al.*, *Adv. Mater.* (2018) 30, 1800159