**Title:**

**Flow chemistry, organoatalysis and 3D-printing: valuable tools in the synthesis of chiral compounds**

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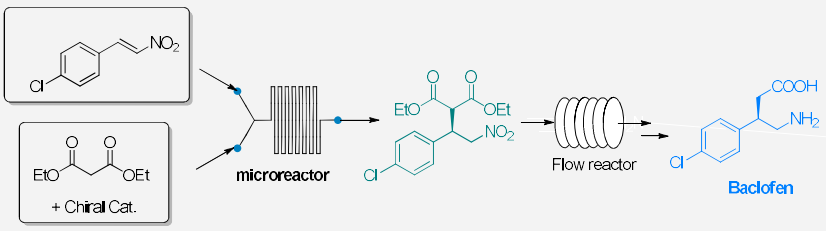
**Abstract:**

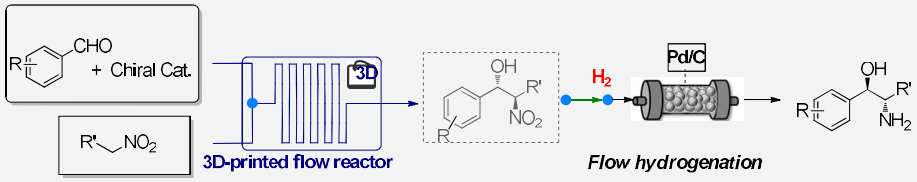
Despite continuous manufacturing has attracted attention of academia and, even more, of industry for its many possible advantages, quite a limited number of chiral organocatalysts have been studied in flow chemistry.[1] The combination of flow reactors with heterogenized catalysts creates ideal technical devices for the rapid continuous production of chemicals with minimum purification. In the case of flow chemistry with chiral catalysts it is evident that the field is still in its infancy, but it holds a lot of promises.

Recently developed organocatalytic stereoselective transformations using polymer-based packed bed and catalytic reactors will be presented. Furthermore, the use of different bifunctional chiral metal-free catalysts in micro- and mesofluidic devices will be described. Metal-free stereoselective additions of activated nucleophiles to β–nitrostyrenes were investigated under continuous-flow conditions in microreactors.[2]




The potential of this flow chemistry approach was demonstrated by the successful synthesis of an advanced intermediate for the preparation of the $GABA_B$ receptor agonist Baclofen and other Active Pharmaceutical Ingredients (APIs) such as (*S*)-Pregabalin and (*S*)-Warfarin.

Additionally, considering that now 3D-printing technology allows chemists to build devices with high precision and well-defined architecture, an in-house designed, 3D-printed reactors were realised and used for the catalytic synthesis of biologically active compounds.




Norephedrine, Metaraminol and Methoxamine have been prepared through a two-steps sequence, involving a stereoselective Henry reaction promoted by a chiral copper catalyst, performed into 1 mL 3D-printed flow reactors made of different materials (PLA, HIPS, NYLON) and a continuous flow hydrogenation.[3]

References:

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