

Innovative solid-liquid reactor for high-speed mass transfer & catalysis without clogging

Reference No: B78159

CHALLENGE

The production of chemicals in the biotech- and pharmaceutical industry frequently involves mass transfer reactions for a variety of applications such as immobilized enzymatic reactions, purifications, extractions and decoloration processes. Existing reactor technologies (STR, FBR, RBR) show poor performance, when it comes to small sized or deformable solids due to clogging in fixed beds and separation problems in stirred systems. However, small solids (e.g. powders) are favorable for mass transfer, since they provide a significantly higher interaction surface.

INNOVATION

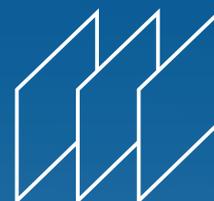
This innovative technology promotes an enhanced rotating bed reactor for **mass transfer reactions**, comprising a flow distributor and a drive unit. The flow distributor is configured to submerge in a fluid medium and to generate a flow of the fluid by rotating around the rotation axis and the drive unit is configured to move the flow distributor perpendicular to the rotation axis. This setup allows generating a flow of the fluid medium through a containment of the solid reactant in a highly effective manner between the different phases. Hence, the rate of the mass transfer reaction, e.g. by **diffusion, adsorption, absorption and extraction** between the fluid medium and the solid reactant is positively affected. The apparatus promotes the mass transfer reaction **without requiring an additional flow system** like additional valves, pumps and pipeworks for controlling circulation, transition or percolation of the fluid medium through the containment of the solid reactant. Compared to existing rotating reactors this technology is fully compatible for the use of very small particles and **prevents these small particles from clogging the retaining filter mesh effectively**.

COMMERCIAL OPPORTUNITIES

- Applicable for accelerated mass transfer reactions in the fields of **chemistry, biotechnology and pharmaceutical engineering**
- Mass transfer reactions in **both directions (liquid \leftrightarrow solid)**, particularly suited for processes like **biocatalysis (immobilized enzymes)**
- Especially effective for the use of **small or deformable particles** as solid reactant (no clogging)
- **Fully scalable** from laboratory to industrial usage

DEVELOPMENT STATUS

Proof of concept



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Technology from
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