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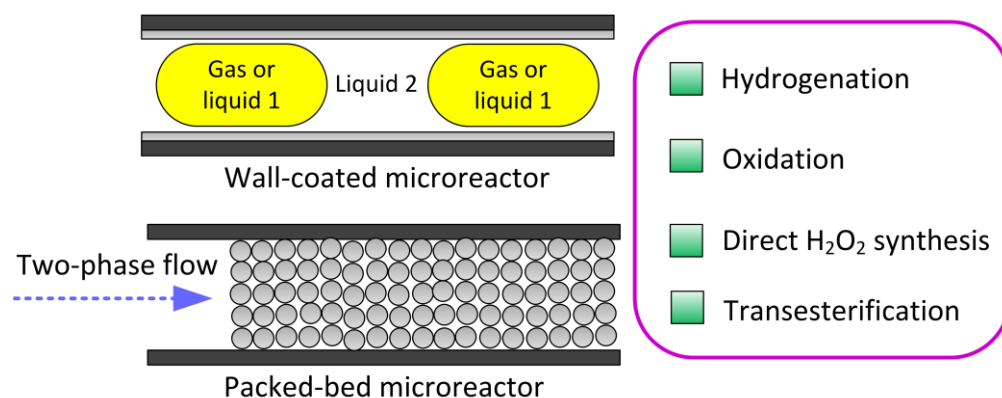
# Multiphase flow processing in microreactors combined with heterogeneous catalysis for efficient and sustainable chemical synthesis

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Graphical abstract



## Highlights

- Microreactors are promising for intensifying solid-catalyzed gas-liquid and liquid-liquid reactions
- Basic operation principles of wall-coated and packed-bed microreactors are discussed
- Examples are given for hydrogenation, oxidation, direct H<sub>2</sub>O<sub>2</sub> synthesis, and synthesis in liquid-liquid systems

## ABSTRACT

The convergence of continuous flow chemistry and microreactor technology creates numerous possibilities towards the development of an efficient and sustainable chemical synthesis. In this field, the combination of heterogeneous catalysis and multiphase flow processing in microreactors represents an important approach. This review presents a summary of the recent progress on the utilization of wall-coated and packed-bed microreactors for carrying out heterogeneously catalyzed gas-liquid and liquid-liquid reactions, with a focus on the microreactor operation principles and selected reaction examples with promising application potential. Finally, an outlook on the future development trends is provided.

*Keywords:* Microreactor; heterogeneous catalysis; multiphase flow; chemical synthesis; green chemistry

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