

Industrial scale ammonia synthesis, as accomplished by the Haber-Bosch process, was a landmark achievement of the 20th century. However, as currently practiced, including feedstock generation, the process accounts for 1-2% of global energy demand and contributes significant fossil-fuel-based CO₂ emissions.

Accordingly, there is much contemporary interest in the development of more sustainable ammonia synthesis routes which could, for example, be operated on the local scale employing renewable energy. The five themes of this discussion will unite different research communities around a topic of mutual interest and great societal importance, with particular emphasis placed upon the transfer of learning between the different themes.

The Discussion will focus on the following five themes:

- Heterogeneous catalytic and chemical looping routes to N₂ activation
- Electrocatalytic and photocatalytic routes to N₂ activation
- Enzymatic N₂ activation
- Homogeneous N₂ activation
- Alternative routes to NH₃ and its applications

Front cover image

A titanium nitride catalyst is synthesized mechanochemically in a vibratory mill. Collisions alter material properties and produce favorable reaction conditions for ammonia synthesis.

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