



Ammonia Synthesis at Moderate Conditions

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Summary: The synthesis of ammonia at moderate temperatures and pressures

Description: Commercial ammonia synthesis relies on the Haber-Bosch process, which uses a potassium-promoted iron catalyst in an energy intensive process that occurs at high temperature and pressures. Because of this, there is substantial motivation to achieve ammonia synthesis at more moderate conditions. This invention details a method and apparatus for the synthesis of ammonia at moderate pressures (below 30 atm) and temperatures ($\leq 400^\circ\text{C}$). A hydrogen permeable membrane reactor with a porous ruthenium catalyst layer is employed. Further opportunities exist for process integration of this membrane reactor with other high-temperature membranes that produce oxygen from air and/or hydrogen from steam and methane.

Main Advantages of this Invention

- Lower production cost
- Reaction proceeds at moderate conditions
- Potential for process integration
- Potential of on-site, scalable production

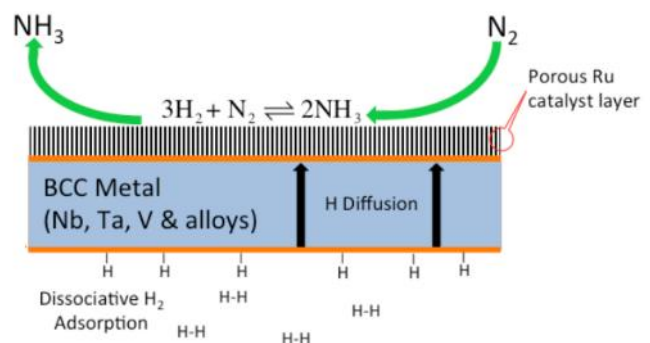
Potential Areas of Application

- Industrial Gas Production Companies
- Fertilizer Companies

ID number: 15028

Intellectual Property Status: US Pat. Appl. No. 15/087,169

Opportunity: We are seeking an exclusive or non-exclusive licensee for implementation of this technology.



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