A MICROCHANNEL REACTOR AND METHOD FOR DECOMPOSITION OF AMMONIA

Carbon-free value chain from production of Ammonia to reforming to Hydrogen

Technology Overview

This technology utilises a microchannel reactor for the decomposition of ammonia, comprising two chambers: one for exothermic combustion of ammonia to generate heat. A second chamber of the reactor with a second catalyst, receives a second stream of ammonia to provide endothermic decomposition of the of ammonia. The exothermic combustion of the ammonia in the first chamber generates the required heat for facilitating the endothermic decomposition of the ammonia in the second chamber the heat being transferred from the first chamber to the second chamber through a wall. Ammonia is an important compound for production of hydrogen.

Technology Benefits

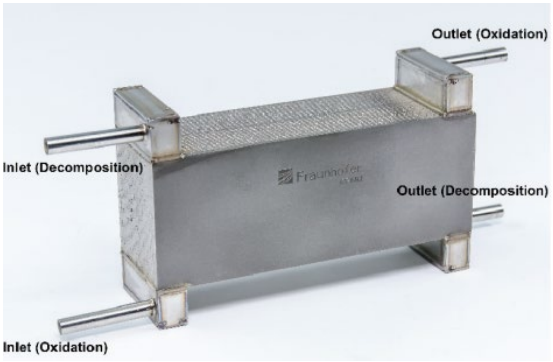
- Large-scale transportation of a liquid hydrogen carrier.
- Carbon-free value chain from production of ammonia to reforming to hydrogen.
- Use of thermal energy generated in the same rector to produce hydrogen also in the same reactor.
- Compactness of the system.

Market Opportunity

Liquid hydrogen carriers will play a significant role in diversifying world energy supply corridor, transporting hydrogen at scale (>1,000 tonnes of hydrogen transported per day), especially across larger distances. Low carbon footprint, high energy density and easy storage and transportation are important key factors for this type of applications. Amongst all liquid hydrogen carriers, ammonia has proven itself as a carbon free and sustainable candidate and, very importantly, it presents advantages of a one-way transport, in fact, ammonia does not need to be directly recovered and recycled after the dehydrogenation step (to release hydrogen). Thus, technologies for reforming ammonia to release hydrogen are expected to be of a high demand in a near future.

Project status

South African patent granted - 2017/08363



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