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**Showcasing research from Professor Kubota's laboratory,
Department of Chemical Engineering, Fukuoka University,
Fukuoka, Japan.**

Ammonia synthesis from nitrogen and steam using
electrochemical cells with a hydrogen-permeable membrane
and Ru/Cs⁺/C catalysts

If produced using renewable electricity, ammonia functions not only as an artificial fertilizer but also as a carbon-neutral fuel. While direct electrolytic synthesis is not straightforward, it is possible to synthesize ammonia from nitrogen and water at around 250°C and 1 MPa by separating proton reduction sites and nitrogen hydrogenation sites with hydrogen-permeable membranes and leveraging the advantages of electrochemical and catalytic reactions. This method is carried out with efficiency comparable to that of Haber-Bosch process reactors. The article discusses research applying Ru/Cs⁺/C catalysts to this technique.

As featured in:



See Jun Kubota *et al.*,
Sustainable Energy Fuels,
2024, **8**, 914.