# Article information:

Recent progress in electrochemical synthesis of carbon-free hydrogen carrier ammonia and ammonia fuel cells: A review | Elsevier Enhanced Reader
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# Article summary:

1. NH3 is a promising hydrogen energy carrier due to its advantages in storage and transportation, as well as its high volumetric energy density.

2. Electrochemical synthesis of NH3 through N2 reduction reaction (NRR) and nitrate reduction reaction (NO3-RR) has potential, but faces challenges in achieving high selectivity and efficiency.

3. Direct NH3 fuel cells have potential as an alternative green energy source, but are limited by the lack of highly active and stable NH3 oxidation electrocatalysts.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

作为一篇综述文章，本文对氨合成和氨燃料电池的最新研究进展进行了介绍，并概述了技术挑战、可能的改进措施和发展前景。文章提到，氨在存储和释放方面存在问题，限制了其发展。同时，直接使用氨燃料电池易于运输，并有望广泛用于移动能耗设备，但受到高活性和稳定性氨氧化电催化剂的缺乏限制。

然而，在文章中并未提及一些潜在的风险和问题。例如，虽然NH3相对于H2来说更容易存储和运输，但它仍然是一种有毒有害物质，在处理、泄漏或事故情况下可能会对环境和人类健康造成危害。此外，NH3的生产也需要大量的能源消耗，并且会产生二氧化碳等温室气体排放。

此外，在讨论NH3作为可再生能源替代品时，应该考虑到其与传统肥料工业之间的联系。尽管NH3在肥料生产中起着重要作用，但过度使用肥料也会导致土地退化、水资源污染等环境问题。因此，在推广NH3作为可再生能源替代品时，应该平衡考虑其与环境保护之间的关系。

总之，本文虽然介绍了NH3合成和NH3燃料电池领域的最新研究进展，但没有全面考虑相关领域存在的潜在风险和问题，并且可能存在一定程度上片面报道或偏袒某些观点的情况。

# Topics for further research:

* Potential risks and hazards of NH3 as a renewable energy substitute
* Environmental and health impacts of NH3 handling
* leakage
* and accidents
* Energy consumption and greenhouse gas emissions in NH3 production
* Link between NH3 as a renewable energy substitute and the fertilizer industry
* Environmental issues associated with excessive fertilizer use
* Balancing NH3 promotion as a renewable energy substitute with environmental protection

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