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A Comprehensive Review of Hydrogen Fuels and Technologies

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Abstract: *Hydrogen is increasingly recognized as a key component of a sustainable energy future due to its clean combustion and versatility across various sectors. This review explores the current state of hydrogen fuels and associated technologies, including production methods, storage, transportation, and fuel cell applications. While hydrogen offers numerous benefits, challenges such as cost-effective production, efficient storage, and infrastructure limitations must be addressed. By synthesizing recent advancements and evaluating future research directions, this paper provides a comprehensive assessment of the hydrogen value chain, emphasizing the technological, economic, and environmental factors shaping the transition to a hydrogen-based economy.*

Keywords: Hydrogen fuel, hydrogen economy, fuel cell technology, hydrogen storage, renewable energy.