From Ethanol to Hydrogen: Exploring Hydrogen Production from Ethanol and Use of Hydrogen-Ethanol Blends in Spark Ignition Engines

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This chapter provides an introductory yet comprehensive review of the production and application of hydrogen-rich gas derived from ethanol, with a particular focus on the production of hydrogen from ethanol reform and the use of ethanol-hydrogen mixtures in spark ignition engines. By synthesizing existing literature and theoretical foundations, the chapter aims to explore the synergistic potential of these two fuels in enhancing engine performance, combustion, and emissions. Special attention is given to the Brazilian context, where ethanol production is abundant and well-established, and the adoption of cleaner, cost-effective energy solutions is urgently needed. Through a multidisciplinary approach, the chapter intends to shed light on the viability and benefits of using hydrogen and ethanol mixtures as an alternative fuel source, offering insights into future research directions.

Keywords: Hydrogen Production, Ethanol Reforming, Hydrogen Enrichment, Ethanol Engines