

Comprehensive Assessment of Hydrogen Storage Media about Toxicity and Exergy-Economics

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Hydrogen is considered as an attractive media that will reduce fossil fuel consumption and greenhouse gas emissions. However, commercial utilization of this media is economically infeasible by its storage and transportation methods. Storing and transporting hydrogen techniques through high-pressure and cryogenic needs an economically efficient replacement by storing hydrogen in a more stable hydrogen carrier. In this study, we carried out an overall evaluation of the toxicity, efficiency, and economic aspects of the Liquid Organic Hydrogen Carrier (LOHC) that can be stored and transported suitably than other methods. The toxicity of the substance was predicted through quantitative correlation with animal tests, and the existing diesel and gasoline were evaluated together as a comparative group. The exergy-economic analysis assumed the same assumption within the defined supply chain from hydrogen production to use. It was carried out by applying the specified parameters. In conclusion, the LOHC showed suitability in various aspects compared to other storage methods. The results suggest that the LOHCs could be a promising option as a hydrogen storage medium in the future.