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Analysis of Recycling Aluminum for Hydrogen Production

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The study intends to provide a cheaper alternative of conventional hydrogen production and recycling Aluminum. This is accomplished by immersing the metal in a corrosion process involving water and alkaline solutions (NaOH, KOH). Aluminum's key benefits for hydrogen production are its recyclability, nontoxicity, and ease of shaping. The solution dissolves the oxide layer, allowing the metal to react. Hydrogen gas and sodium aluminate are produced when Aluminum combines with both water and NaOH. Metallic Sample of Aluminum foil were exposed to NaOH concentrations range of 1 to 3 mol , and different reaction temperatures ranging from 30oC to 60oC and using two different kinds of salt added to solution. The hydrogen gas produced can be consumed in a fuel cell. A prototype reactor is designed for commercial use. Temperature, alkali concentration, and adding salt all have a significant impact on the reaction. Temperature and NaOH concentrations both increase the overall reaction rate. Addition of salts without processing or milling and lowering water quality both inhibit the reaction rate.

Biography

Rami Al Najada is a Bachelor of Science with Honors in Sustainable and Renewable Energy Engineering. An engineer with experience in the R&D sector in solar energy and green hydrogen industries. Researched renewable energy policy implementations and SDGs with the British University in Egypt and UNDP Egypt. Experienced in hydrogen production technologies and research in alternative energy solutions. Won competitions in research, engineering and robotics. Won the 1st place in the undergraduate research competition, and 2nd in Solar Decathlon Middle East. Affiliated with YOUNGO, SDG7 YC, EcoWave, UAE Society of Engineers and others. Featured projects include an experimental study of metallic aluminum hydrolysis to produce green hydrogen, and hybrid energy systems, such as hybrid photovoltaic-thermoelectric systems and photovolta-ic-piezoelectric experiments. Worked also as a scientific projects supervisor in the Emirates Science Club guiding youth in nationwide competitions. Founder of Timepiece project management services, providing innovative services by employing youth to utilize their skills towards greater ambitions.

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