

Hydrogen generation from passivated-aluminum nanoparticles

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It is well known that hydrogen gas is difficult to carry and storage because of problems such as storage weight and/or volume under high pressure. To obtain hydrogen gas without having storage problem, various storage materials have been proposed. For example, in the case of chemical hydrides, its hydrogen storage capacity ranges from 10% to over 30%, depending on substances. The chemical hydrides have problems such as cost, recycling and lifetime. Therefore, much effort has been devoted to new materials for storing hydrogen.

Use of aluminum for storing hydrogen is very attractive, which is cost-effective material and generates hydrogen environmentally friendly by using water only. The generation of hydrogen occurs on the surface of aluminum. Thus, the surface area is critical for hydrogen generation, and the best way to increase the surface area is to reduce the size of aluminum.

In this work, we applied aluminum nanoparticles passivated with various polymer to generate hydrogen. The kinetic rate of reaction depending on polymer was investigated.