Organic Catalyst for Higher Rate of Hydrogen Generation & Efficient Solid-State Storage

A method for controlling the generation of hydrogen gas from a metal borohydride solution with organic pigment catalysts

A comparably priced but more active catalyst in the process to solidify hydrogen that overcomes its significant barrier to automotive adoption is a move toward sustainability, environmental protection, and energy independence. Storing hydrogen safely and efficiently must be accomplished before it can be a widespread, mainstay fuel source, because it is a gas in standard conditions.

Based on the simple molecular gas $H_2$, this domestic and environmentally “green” fuel must be stored on-board a vehicle in heavy, pressurized cylinders that are difficult to carry as a supply when traveling relatively far. When stored as a solid, hydrogen could overthrow refined petroleum fuel as the source to power the market of over 1 billion cars worldwide. A route to overcoming this, by converting $H_2$ to its solid state, relies significantly on catalysts in the process of $H_2$ generation from a borohydride solution. Conventional catalysts are often inorganic metallic powders that are not as active as a newly invented organic catalyst that offers a higher rate of hydrogen generation at a comparable cost.

**Technical Details**

A method using the organic pigment catalyst, the critical aspect of this technology, calls for immersing the catalyst in borohydride solution for a controllable rate of on-board hydrogen gas generation for fuel cells or combustion engines, primarily in vehicles. These catalysts accelerate the reaction by acting as an oxidizing agent toward the borohydride ion and a reducing agent of the production of hydrogen. With this type of catalyst, $H_2$ generation from a borohydride solution can be accomplished with readily available materials, versatility, reliability, and accuracy. The new way of hydrogen release enables accurate and economical material and fuel consumption.

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**Benefits**

- Higher rate of hydrogen generation
- Safe and effective hydrogen storage
- On-board and on-demand usefulness
- Supports environmentally sustainable fuel

**Applications**

- Hydrogen-fueled applications

**Tech Field**

Hydrogen Fuels

**Keywords**

hydrogen, fuel cell, combustion engine, borohydride, transportation, catalysts, pigments, clean energy, automotive, vehicles

**US Issued Patent**

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