USF Available Technologies

Technology Transfer Office

Hydrogen Storing Nano-Foil and Method of Manufacture

Researchers at the University of South Florida have developed an improved method of storing hydrogen using nano-foil technology.

There is a great deal of interest in developing a hydrogen fuel cell to power a motor vehicle. However, a major limitation of current fuel cells is that they do no store enough hydrogen. The development of a fuel cell with the ability to safely carry enough hydrogen on-board a vehicle to enable at least 300 mile range is critical to the success of hydrogen fuel cell technology.

USF researchers have developed a novel hydrogen storage system that employs a coiled nano-foil hydride, and methods for forming hydrogen absorbing nano-foil coils without backing materials. The nano-foil is deposited on a thin substrate, such as a Teflon belt, and is subsequently removed from the belt with a sharp bend. The process is continuous and the film is spooled in a vacuum chamber.

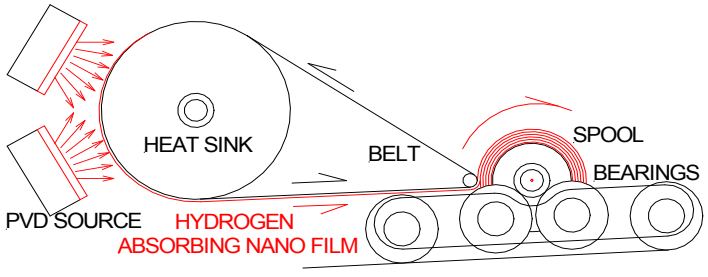
The nano-foil produced in this manner provides not only large areas but also nano grain boundaries, meaning the surface areas are equivalent to small particles without the handling difficulty, allowing the storage of larger amounts of hydrogen.

This technology sets the stage for the development of new and innovative fuel cell technology that meets the challenging performance required to make hydrogen powered automobiles competitive with conventional vehicles.

ADVANTAGES:

- **Surface areas are equivalent to small particles without handling difficulty**
- **Production method uses environmentally benign processes without chemicals**
- **Nano-film is capable of storage, self-support without breakage, and expansion up to 20% of its initial volume**

Hydrogen Fuel Cell that Meets the Challenging Performance Required to Power Automobiles



Process Schematic: Nano Film Deposited on Belt Until Layer is Self-Supporting; then Nano Film is Spooled.

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