Closing the hydrogen economic loop

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The inventor of the nickel metal hydride (NiMH) technology used for building batteries for countless portable electronic gadgets and now hybrid gas-electric cars believes the hydrogen economy is already upon us.

In a paper published in the current issue of the *International Journal of Nuclear Hydrogen Production and Applications*, Stanford Ovshinsky, Chairman and CEO of Ovshinsky Innovation LLC, based in Bloomfield Hills, Michigan, explains that we already have the means for making the hydrogen economy realistic.

Hydrogen is considered the "ultimate" fuel alternative to fossil fuels such as oil, coal and natural gas. As such, research is focusing on how to produce hydrogen from renewable resources in a sustainable way and finding ways to store it effectively and safely so that it can be released on demand for powering vehicles and producing electricity.

The global economy is based upon energy but society needs now, more than ever, a non-polluting fuel that requires no strategic military defense unlike oil. "The transition from fossil fuels to hydrogen is of revolutionary import not only for its societal impact but also for the new materials science that it absolutely requires in all of its aspects," explains Ovshinsky, "New science and new technologies build much needed new industries, which provide not only jobs but also feedback into the educational system."

According to Ovshinsky, the hydrogen economy, which will emerge

from such technology, was kick-started with the introduction of the Ovonic nickel metal hydride battery used in hybrid vehicles. Reversible storage of hydrogen in a solid hydride permits the entire loop of hydrogen generation, storage and use, to be carried out now, rather than at some distant point in the future. Ovshinsky suggests that that despite the observations of some critics of the notion of a hydrogen economy, the creation of a fuel economy based on hydrogen, is not only practical and realistic but is available to our global society in the near-term.

He points out that by storing hydrogen reversibly in disordered solids, this solves the problems of storage, kinetics (speed of uptake and release) and cycle life. To this end, Ovshinsky and his colleagues have created a family of hydride compounds capable of real-world applications. Underpinning this is the vast catalytic surface area found in these materials, which means that when fabricated into thin film, continuous web, multi-junction devices, they can use the entire spectrum of sunlight to break up water to generate hydrogen, which is stored within the material ready for later use.

Source: Inderscience Publishers