

Silicon nanotubes for hydrogen storage in fuel cell vehicles



Researchers report hydrogen storage by silicon nanotubes exceeds that of their carbon counterparts. Silicon could play a large role in the emergence of "clean" hydrogen fuel cell vehicles. Credit: ornl.gov

After powering the micro-electronics revolution, silicon could carve out an important new role in speeding the debut of ultra-clean fuel cell vehicles powered by hydrogen, researchers in China suggest.

Their calculations show for the first time that silicon nanotubes can store hydrogen more efficiently than their carbon nanotube counterparts. The study will appear in the April 24 issue of ACS' *Journal of Physical Chemistry C*.

Dapeng Cao and colleagues note that researchers have focused on the potential use of carbon nanotubes for storing hydrogen in fuel cell vehicles for years. Despite nanotubes' great promise, they have been unable to meet the hydrogen storage goals proposed by the U.S. Department of Energy for hydrogen fuel cell vehicles. A more efficient material for hydrogen storage is needed, scientists say.

In the study, Cao's group used powerful molecular modeling tools to compare the hydrogen storage capacities of newly developed silicon nanotubes to carbon nanotubes. They found that, in theory, silicon nanotubes can absorb hydrogen molecules more efficiently than carbon nanotubes under normal fuel cell operating conditions.

The calculations pave the way for tests to determine whether silicon nanotubes can meet government standards for hydrogen storage, the scientists note.

Source: ACS

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