Hydrogen storage in nanoparticles works

Dutch chemist Kees Baldé has demonstrated that hydrogen can be efficiently stored in nanoparticles. This allows hydrogen storage to be more easily used in mobile applications. Baldé discovered that 30 nanometre particles of the metal hydride sodium alanate make the favourable extraction and storage of hydrogen possible.

Hydrogen is considered to be a clean storage and transport medium for energy. Therefore many future scenarios are based on the storage and transport of hydrogen. Various obstacles need to be overcome before this so-called hydrogen economy can be used on a large scale. One of these is the storage of hydrogen.

A highly-promising method for storing hydrogen is its absorption in a metal hydride. A disadvantage of this method is that hydrogen uptake and release rates are low for metal hydrides. Reducing the particle size of the metal hydride to a nanometre scale is a possible solution to this problem.

Baldé demonstrated that 30 nanometre particles of sodium alanate store hydrogen in a highly efficient manner. With the addition of a titanium catalyst, a further reduction in the particle size to 20 nanometres is possible and this leads to an even more efficient storage of hydrogen.

The deactivation process of the titanium catalyst was also studied because this inhibits the uptake and release rate of hydrogen. Structural characteristics that exert an influence on the catalyst's activity were found. This knowledge can be used to develop an improved catalyst.

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