

Hydrogen storage-release property of metal-deposited hollow glass microspheres

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Hydrogen storage and transportation are very difficult to handle because hydrogen is the lightest material on earth. Although the compression or liquefaction of hydrogen represents a feasible method for hydrogen storage, a number of problems remain to be solved from the standpoint of safety and energy efficiency. Hollow glass microsphere has attracted considerable attention as promising material. The storage of compressed hydrogen gas in hollow glass microsphere offers potential advantage of high efficiency, safety, lightness, cheapness and simplicity in storage system design. Hollow glass microsphere is capable of containing hydrogen at pressure up to 150 MPa, with corresponding gravimetric efficiency to be as great as 21 wt.%. The primary aim of this research is the preparation of hollow glass microsphere from flame forming method and the determination of the hydrogen storage capacity of hollow glass microsphere. A number of processing parameters are investigated, including the composition and heat treatment of frits, the use of different blowing agents and the effect of metal oxide doping on the hollow glass microsphere.