

Microporous and Mesoporous Materials

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Novel preparation of CMK-3 nanostructured material modified with titania applied in hydrogen uptake and storage

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ABSTRACT

This work deals with the development of a novel procedure to synthesize titania-modified nanostructured carbon employing Ti-SBA-15 as hard template. The new mesoporous carbon displays high specific surface area of 1044 m²/g and large pore volume of 0.7 cm³/g. XRD pattern of Ti-CMK-3 indicates that the ordered structure of this material is similar to the CMK-3. XRD, XPS and UVeVis-DRS analysis indicated that Ti is highly dispersed as anatase phase in Ti-CMK-3. The synthesized Ti-CMK-3 exhibited significantly enhanced H₂ storage properties (2.6 wt%, equivalent to 13 mmol/g) compared with CMK-3 without Ti (2.2 wt%, 11 mmol/g) at 77 K and 10 bar.

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