

## **Effect of Nickel Oxide on Hydrogen Storage Behaviors of Mesoporous SBA-15**

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**Abstract:** In this work, we prepared the Ni-loaded porous SBA-15 (SBA-15) by a deposition-precipitation (D-P) method, in order to enhance the hydrogen storage capacity. The structure and morphology of the Ni/SBA-15 were characterized by X-ray diffraction (XRD) and field emission transmission electron microscopy (FE-TEM). The results showed that, at the Ni loading used at the D-P times in the range of 0-120 min, SBA-15 preserved the well-ordered hexagonal porous arrangement. The textural properties of the Ni/SBA-15 were analyzed using N<sub>2</sub> adsorption isotherms at 77 K. Specific surface area and mesopore volume of the samples were determined from the Brunauer-Emmett-Teller (BET) equation and Barrett-Joiner-Halenda (BJH) method, respectively. The hydrogen storage capacity of the Ni/SBA-15 was evaluated at 298 K/10 MPa. The hydrogen storage capacity of the Ni/SBA-15 was increased in accordance with Ni content. Consequently, it was found that the presence of Ni on mesoporous SBA-15 created hydrogen-favorable sites which enhanced the hydrogen storage capacity by spillover effect.

**Key words:** SBA-15, Ni, D-P method, Hydrogen storage behaviors, XRD