

Supplementary Information

Nanoporous Ni with High Surface Area for Potential Hydrogen Storage Application

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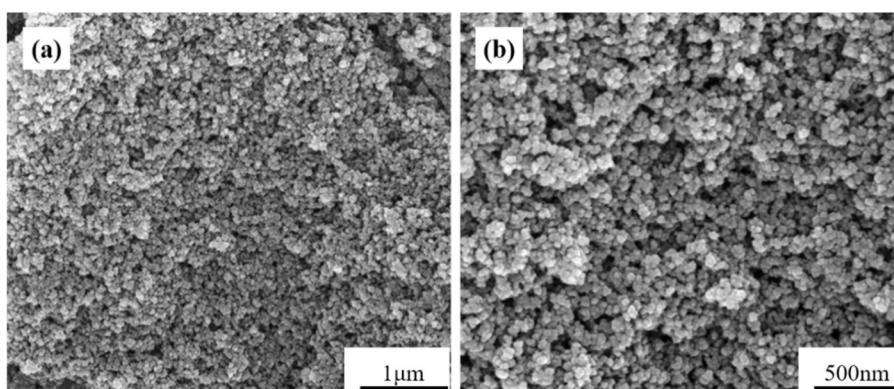


Figure S1. SEM images for SiO₂ aerogel.

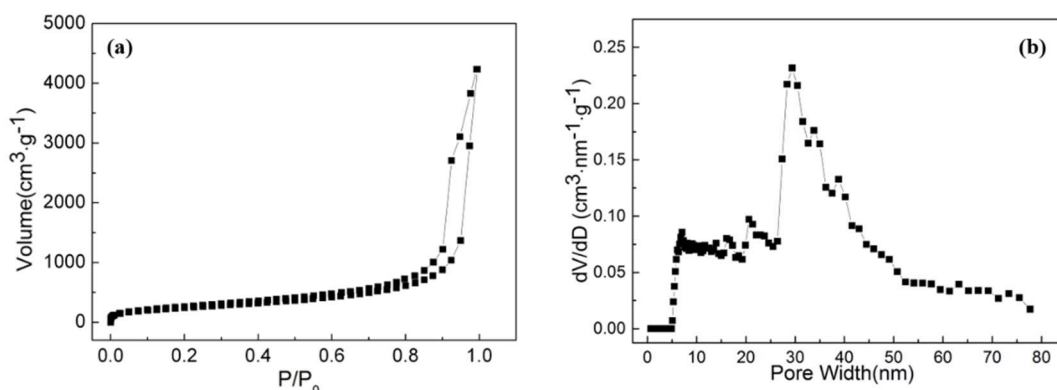


Figure S2. Nitrogen sorption isotherms (a) and size distribution (b) for SiO₂ aerogel.

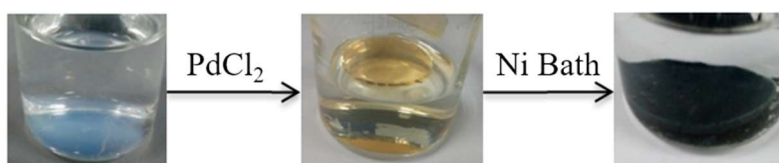


Figure S3. Chemical plating processes of Ni in the SiO₂ aerogel.

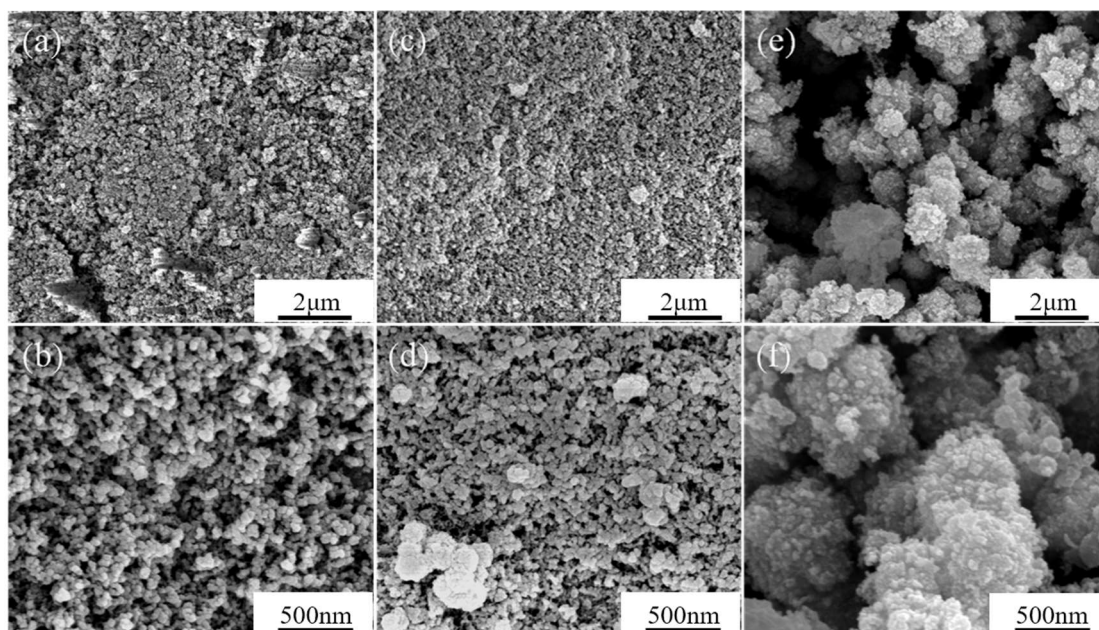


Figure S4. SEM images for SiO₂/Ni composites.

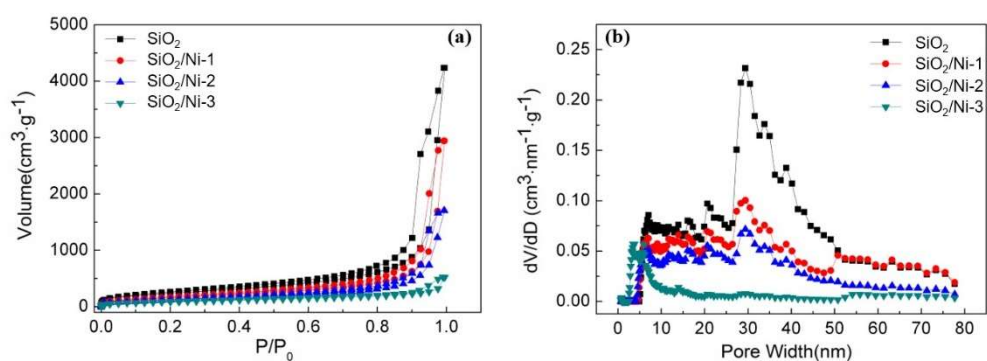


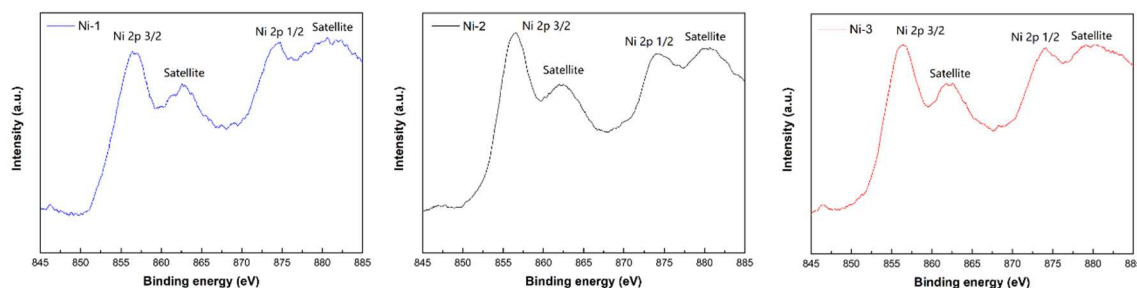
Figure S5. Nitrogen sorption isotherms (a) and size distribution (b) for SiO₂/Ni composites.

Table S1. Comparison of textural characteristics of the SiO₂/Ni composites at different electroless plating time at 35 °C determined from nitrogen adsorption-desorption isotherms.

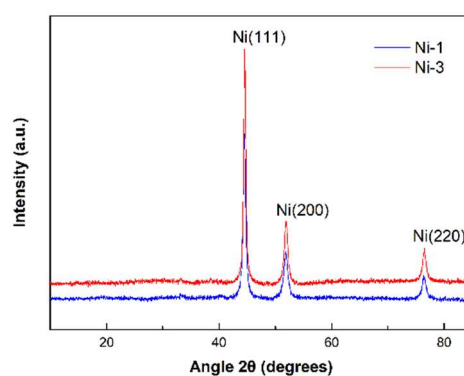
Samples	S _{BET} (m ² /g)	Total Volume (cm ³ /g)	Average pore size (nm)
SiO ₂	890.64	6.59	29.50
SiO ₂ /Ni-1	606.01	4.56	30.11
SiO ₂ /Ni-2	455.71	2.64	23.20
SiO ₂ /Ni-3	325.37	0.81	9.96

Table S2. Ni content and O content for nanoporous Ni analysed by EDS, ICP-OES and XPS.

Sample s	Ni content from EDS (wt %)	O content from EDS (wt %)	Ni content from ICP-OES (%)	Ni content from XPS (at %)
Ni-1	76.15	5.05	95.23	82.96
Ni-2	76.97	5.19	96.10	84.42
Ni-3	74.28	4.46	93.47	80.62

**Figure S6.** XPS spectrum of Ni 2p region for nanoporous Ni.

In order to investigate the surface composition of nanoporous Ni, XPS was used to determine the chemical state of the product. The Ni 2p spectrum are shown in Figure S6, in which two major peaks at 856.15 eV and 874.16 eV are indexed to Ni²⁺ of Ni(OH)₂ formed on the surface of nanoporous Ni during the removal of template under alkaline condition. Meanwhile, combined the results of EDS and ICP-OES, it can be seen that the amount of Ni(OH)₂ is very low, and there is almost no existence of NiOx in the spectrum of XRD. Therefore, we can conclude that nanoporous Ni is mainly composed of crystalline Ni.

**Figure S7.** XRD spectrum for nanoporous Ni.

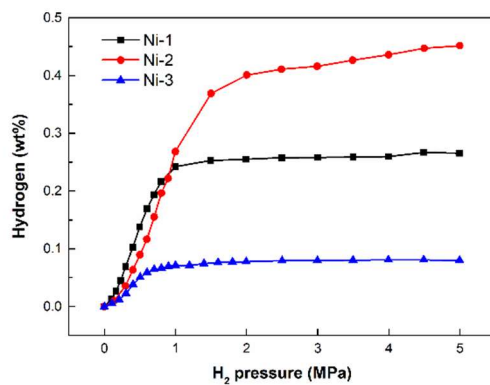


Figure S8. Hydrogen adsorption curves for nanoporous Ni.