

Supporting Information

Preparation and characterization of a highly dispersed and stable Ni catalyst with microporous nanosilica as support

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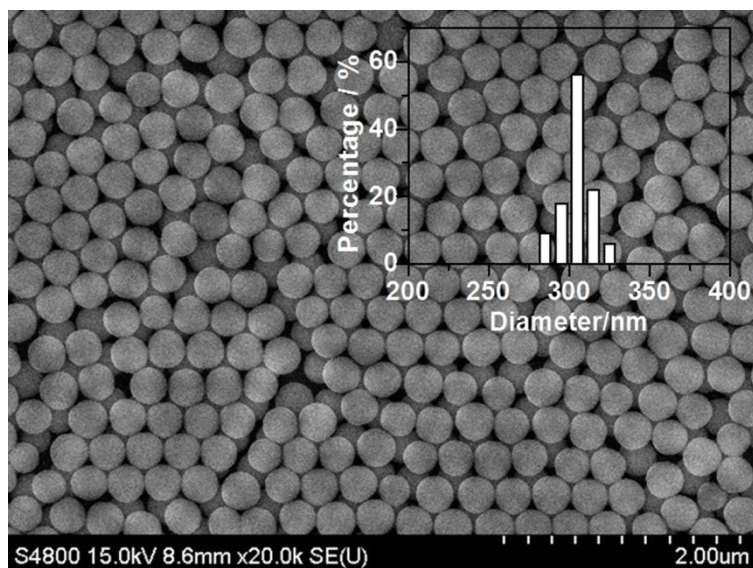


Fig. S1. SEM image of SiO₂ nanoparticles prepared by a modified Stöber method.

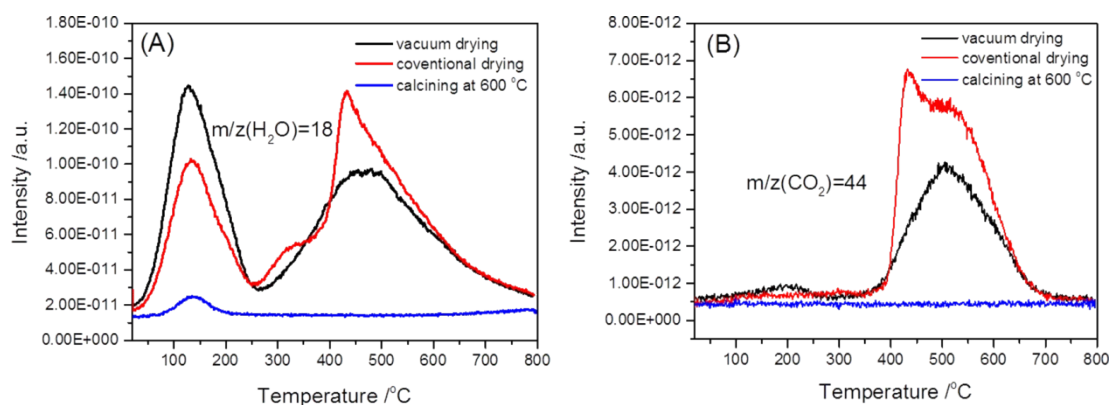


Fig. S2. Profiles of $m/z = 18$ (A), and 44 (B) measured by mass spectrometer during thermal decomposition of different nanosilicas in O₂/He mixture.

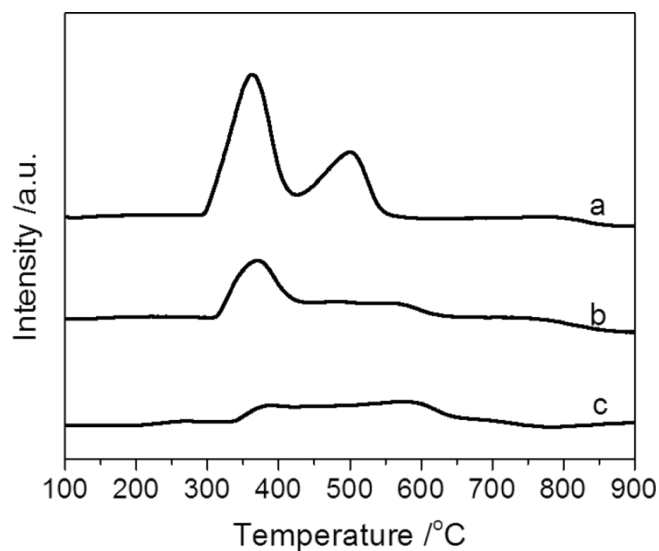


Fig. S3. H₂-TPR profiles of different catalysts: (a) 5.0 wt% Ni/SiO₂-D1; (b) 2.0 wt% Ni/SiO₂-D1; (c) 1.5 wt% Ni/SiO₂-D1.

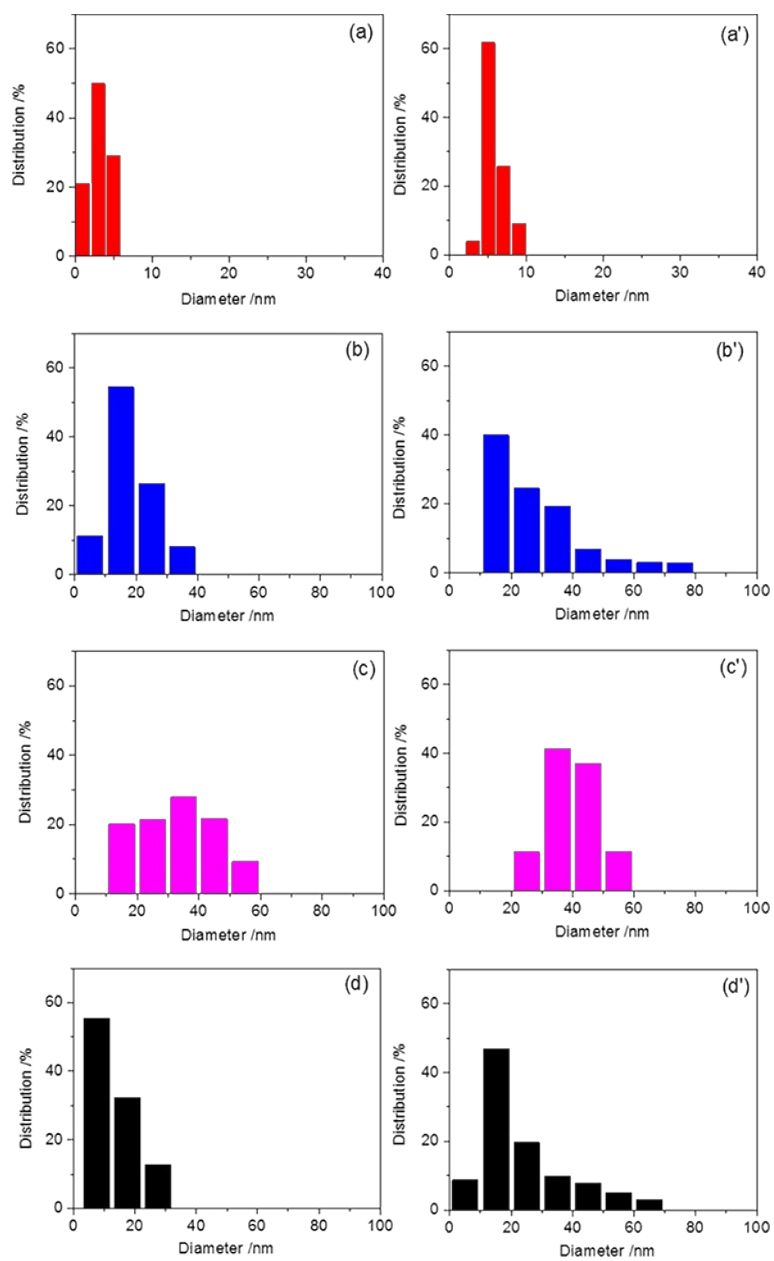


Fig. S4. Ni particle size distributions for Ni/SiO₂-D1 catalyst before (a) and after 200 h (a') reaction, Ni/SiO₂-D2 catalyst before (b) and after 60 h (b') reaction, Ni/SiO₂-C catalyst before (c) and after 30 h (c') reaction, and Ni-EDTA/SiO₂-D1 catalyst before (d) and after 60 h (d') reaction. Reaction conditions: T=750 °C, CH₄/O₂/Ar=2:1:4, GHSV=1.0×10⁵ mL g⁻¹ h⁻¹.

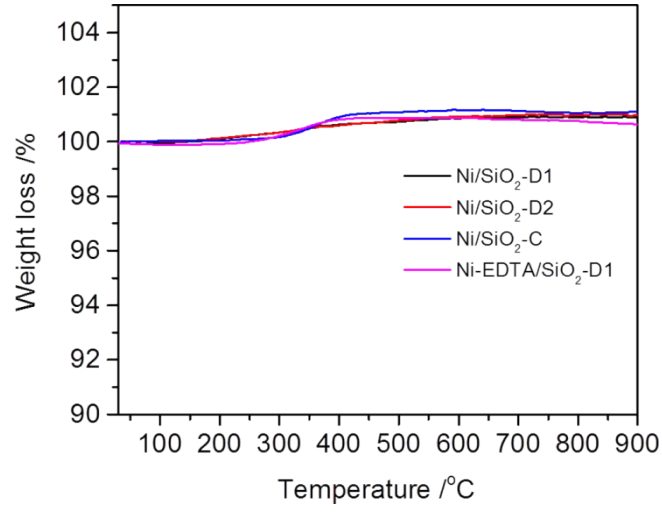
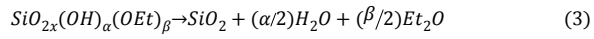
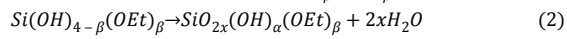
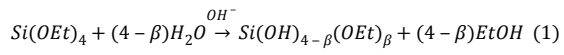


Fig. S5. TG profiles of different catalysts after the POM reaction.



Equations for the Stöber reaction