

Supplementary Information

Pomegranate-like Core-shell Ni-NSs@MSNSs as High Activity, Good Stability, Rapid Magnetically Separation and Multiple Recyclability Nano-catalyst for DCPD Hydrogenation

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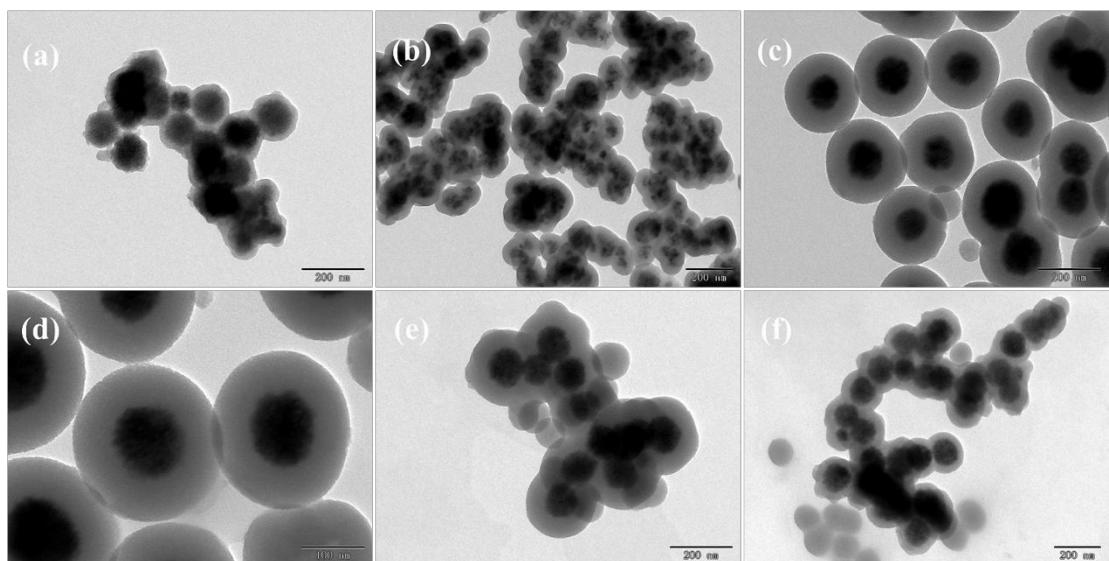


Figure S1. TEM images of the influence of different CTAB concentrations on NiO-NSs@MSNSs core-shell structure: (a) 1.14 mM, (b) 2.28 mM, (c, d) 3.42 mM, (e) 4.56 mM, (f) 6.84 mM.

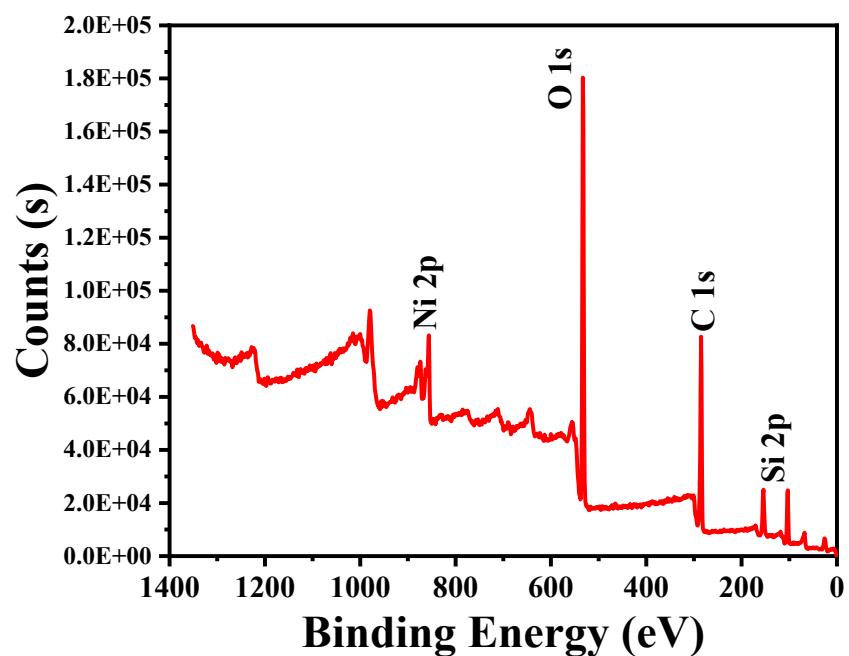
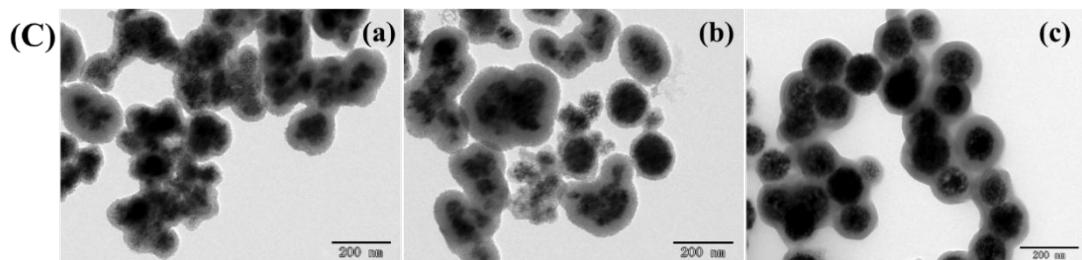
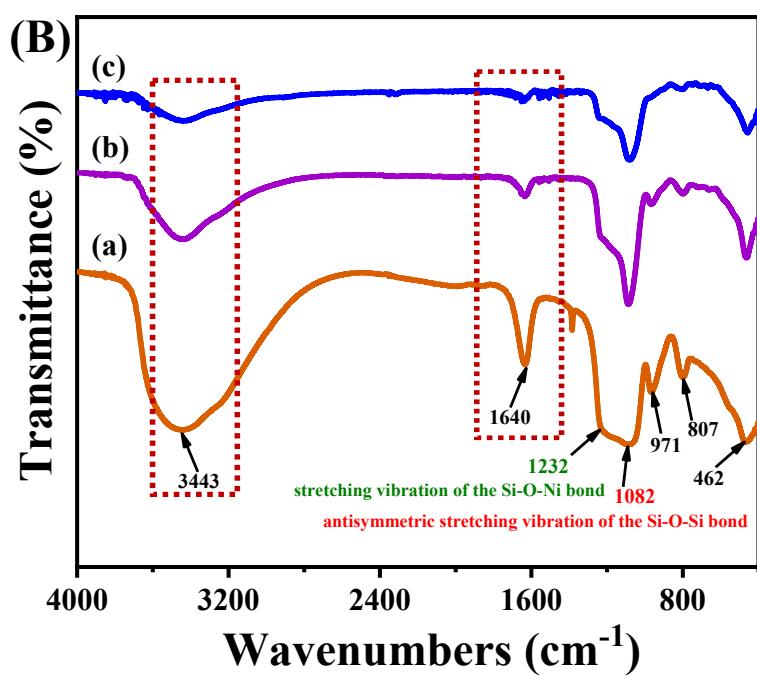
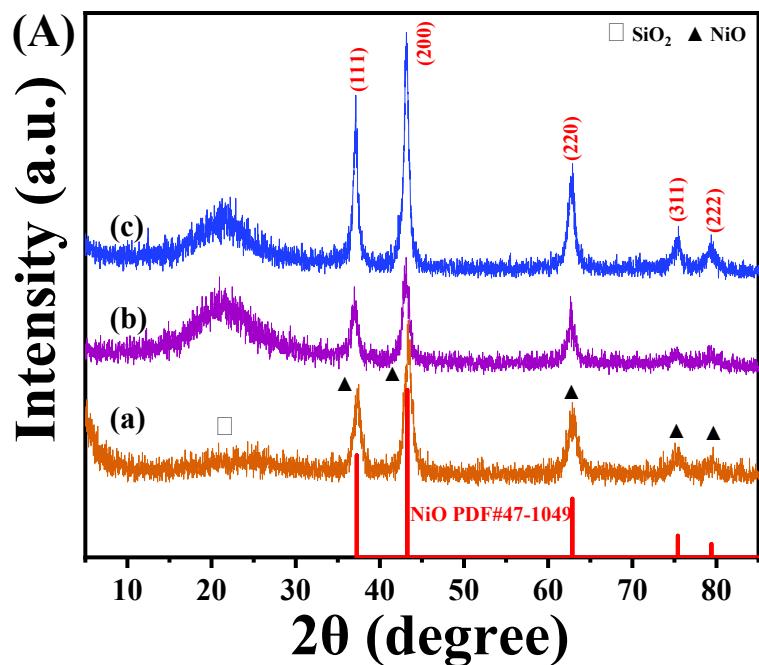


Figure S2. The survey XPS spectrum of the freshly reduced Ni-NSs@MSNSs.



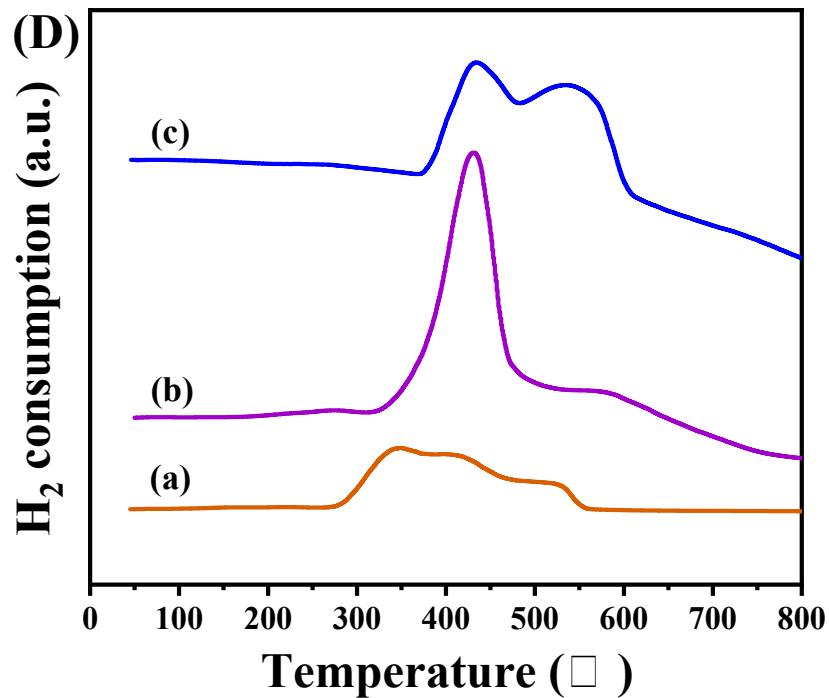


Figure S3. XRD patterns (A); FT-IR spectras (B); TEM images (C); and H₂-TPR profiles (D) of NiO-NSs@MSNSs core-shell precursors at different calcination temperatures in air: (a) 350 °C, (b) 550 °C, and (c) 750 °C.

Table S1. Metal crystallite of samples calculated from Ni (111) plane by the Scherrer equation.

Samples	Metal Crystallite (nm)
NiO-NSs	10.8
Ni-NSs	33.7
NiO-NSs@MSNSs	11.2
Ni-NSs@MSNSs	13.0
NiO/MSNSs-15	-
Ni/MSNSs-15	-
NiO/MSNSs-40	20.6
Ni/MSNSs-40	17.9
MSNSs	-