Electronic Supplementary Material (ESI) for CrystEngComm.

Supporting Information

Hemoglobin-like NiO Nanostructures as Potential Carriers to Support Noble Metals with Enhanced Catalytic Performances

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Experimental section:

Synthesis of 200 nm $Ni_2(OH)_2CO_3$ precursor:

0.2 mmol $Ni(NO_3)_2$ and 105 mg PVP (k30) are dissoved in 10 mL DMF solution followed by a solvothermal treatment at 190 ^oC for 24 h. After cooled down to room temperature, the products are collected by centrifugation and washed with water for three times.

Increasing the feeding amount of $Ni(NO_3)_2$ can induce the size and shape evolutions of the precursors. For example, addition 0.5 mmol and 1 mmol $Ni(NO_3)_2$ at the bigginning of the reaction can produce 500 nm hemoglobin-like NiO and 1 um nanosphere, respectively.

Synthesis of NiO nanocrystals:

The well dried $Ni_2(OH)_2CO_3$ precursors are heated in air at a heating rate of 1 ^oC/min and maintained at 400 ^oC for 60 min.

In-situ growth of Pt NPs on the surface of NiO nanocrystals:

50 mg NiO powder is dispersed in 10 mL glycol by ultra-sound treatment. Then 30 mg PVP (k30) and 3 mL K_2PtCl_4 solution (0.02 mM) are added. The mixture is heated at 50 ^oC for 30 min followed by a solvothermal treatment at 130 ^oC for 2 hours.

Catalytic test:

30 mg of catalysts IS put in a stainless steel reaction tube. The experiment was carried out under a flow of reactant gas mixture (1 vol % CO, 99 vol % simulated air) at a rate of 30 mL/min. The composition of the gas was monitored on-line by gas chromatography.

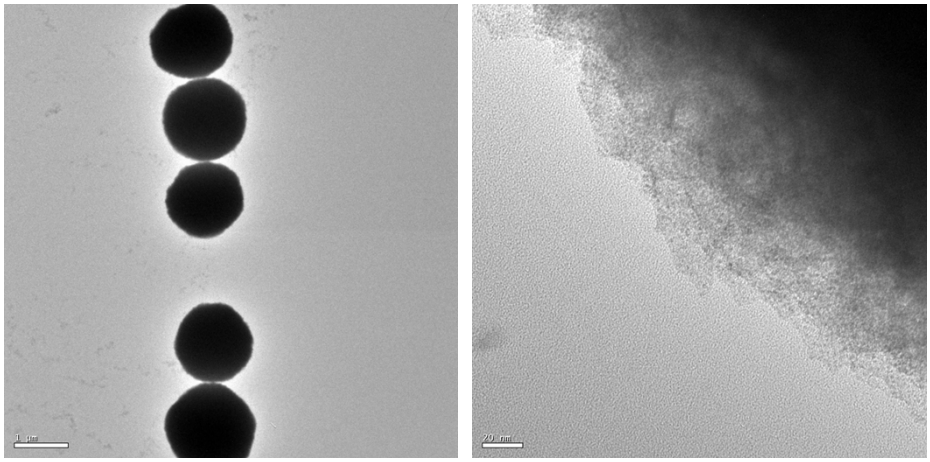

Figure S1. TEM images of sub 1 um $Ni_2(OH_2)CO_3$ nanospheres.

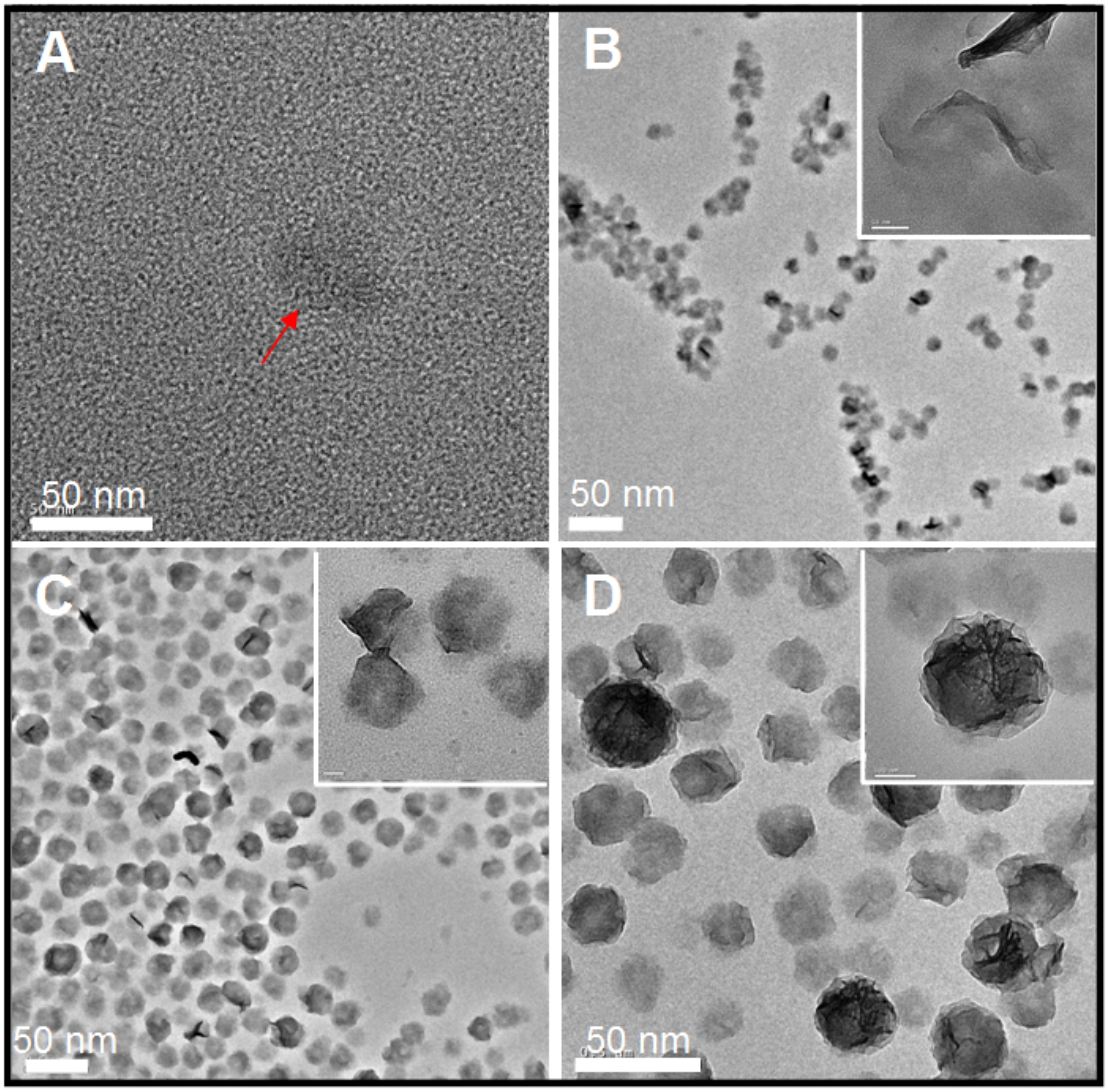

Figure S2. TEM images of the $Ni_2(OH)_2CO_3$ precursors obtained at different reaction time: (A): 1 hour; (B): 2 hours; (C): 3 hours; (D): 4 hours.

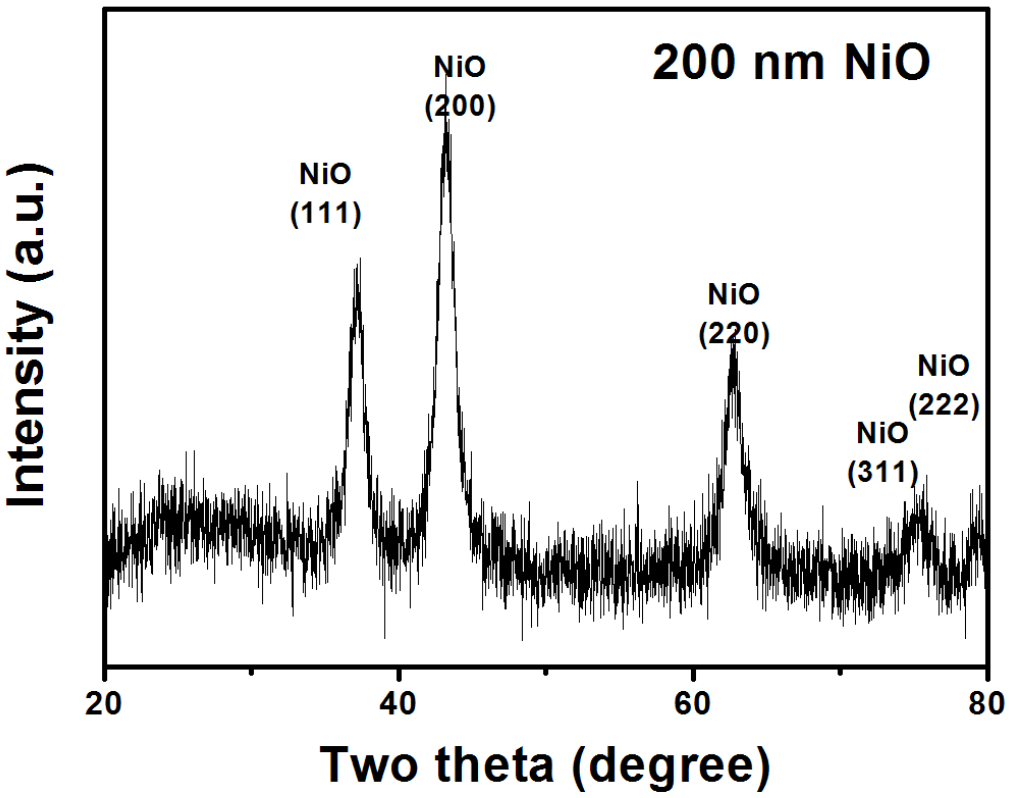

Figure S3. XRD spectra of 200 nm NiO.

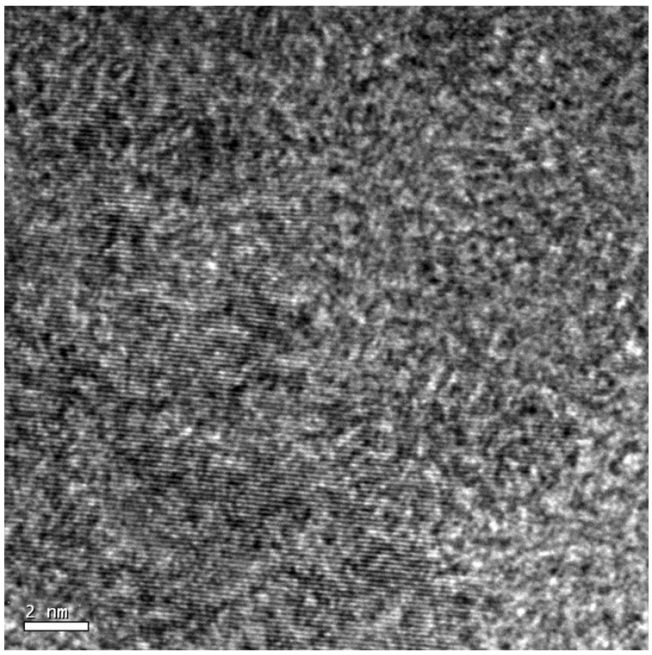

Figure S4. HR-TEM image of 200 nm NiO.

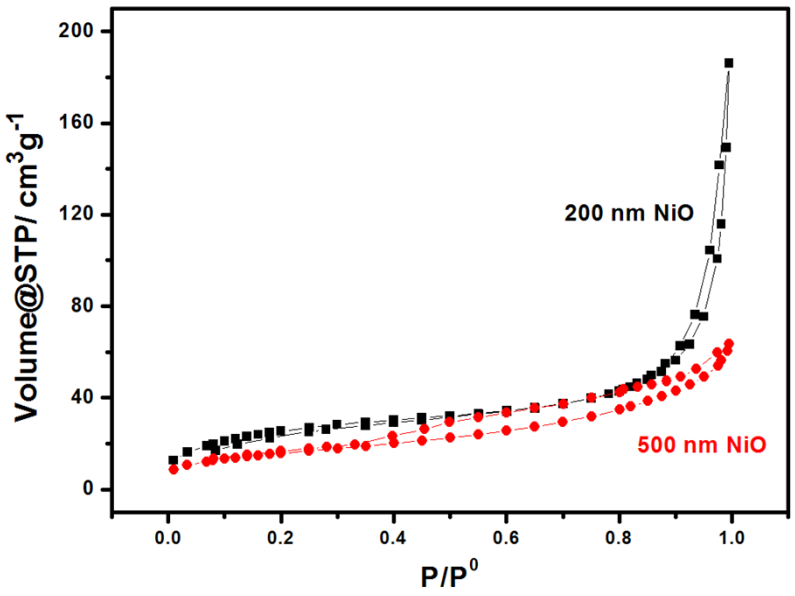

Figure S5. N_2-adsorption–desorption isotherms of NiO nanocrystals with different particle sizes (500 nm NiO: red line; 200 nm NiO black line).

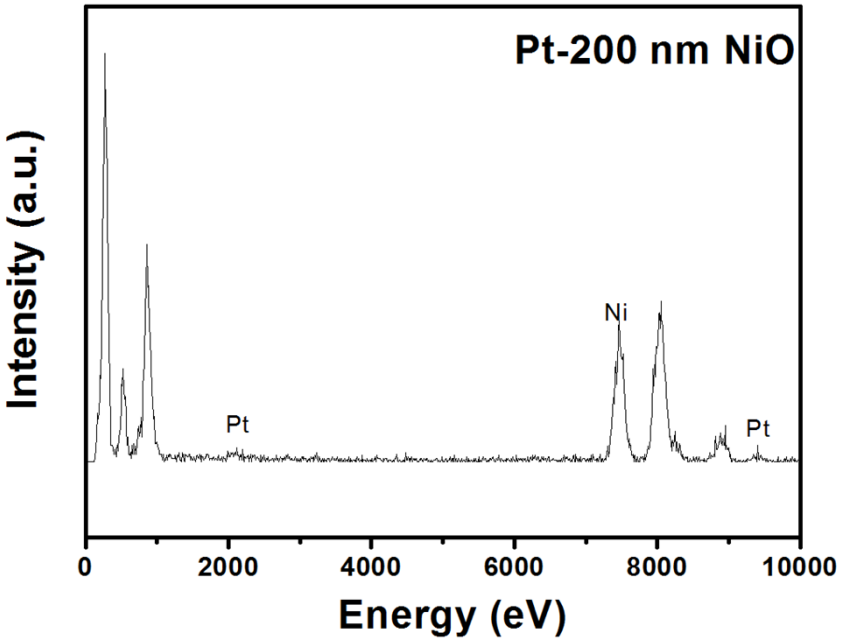

Figure S6. EDX spectrum of Pt-200 nm NiO.

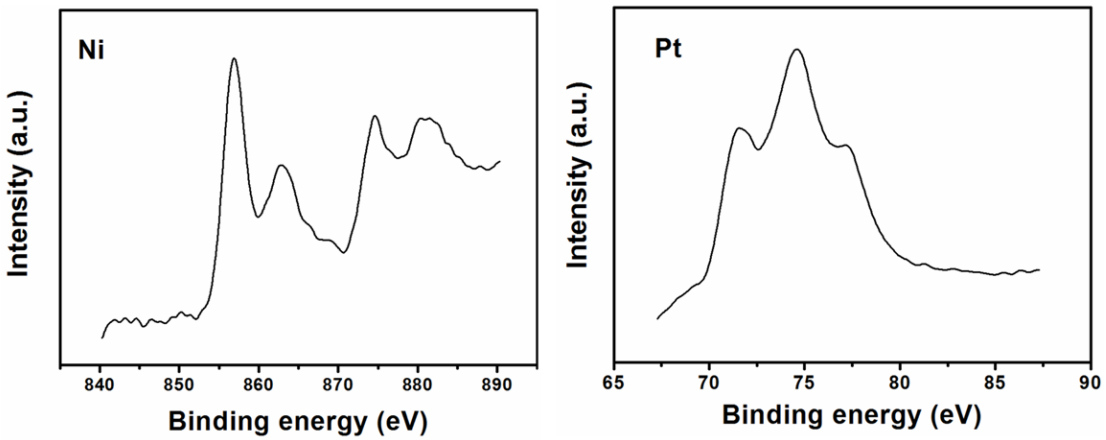

Figure S7. XPS spetra of Ni AND Pt in Pt-200 NiO sample.

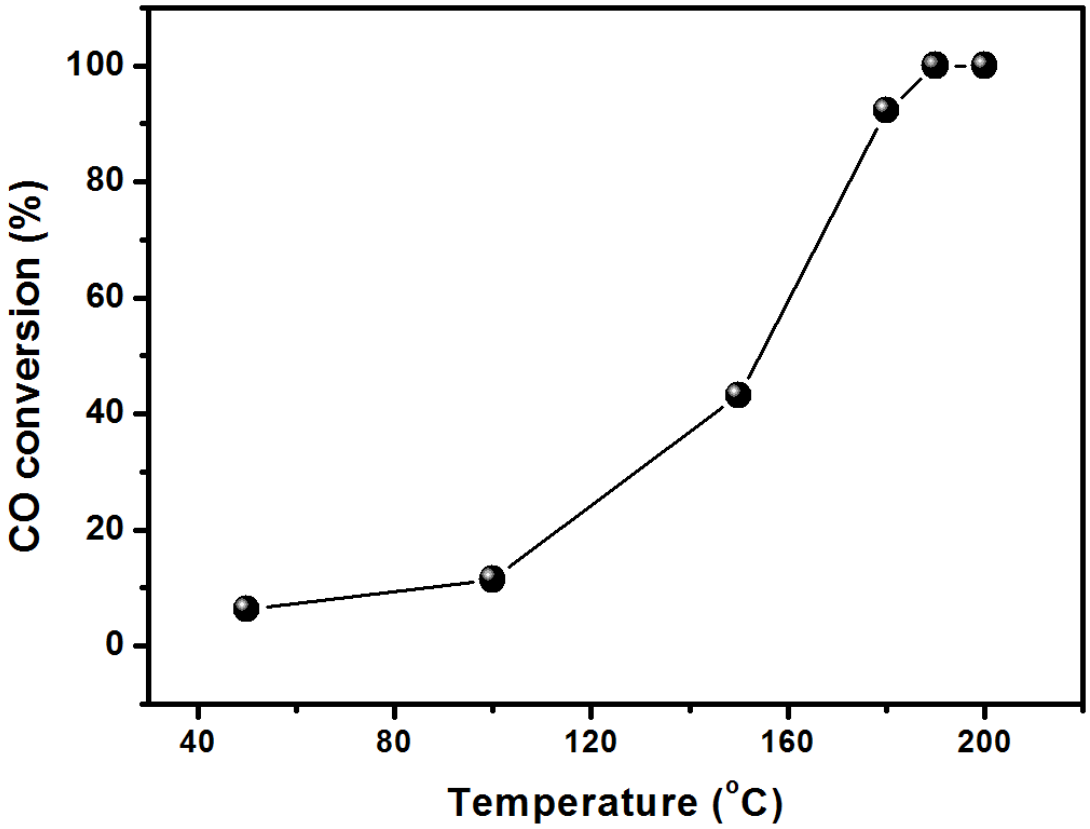

Figure S8. CO conversion curves of Pt-commercial NiO.