

Supporting Information

Electro- and Photochemical Water Oxidation on Ligand-free Co₃O₄ Nanoparticles with Tunable Sizes.

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Effect of photochemical process on colloidal and morphological stability of Co_3O_4

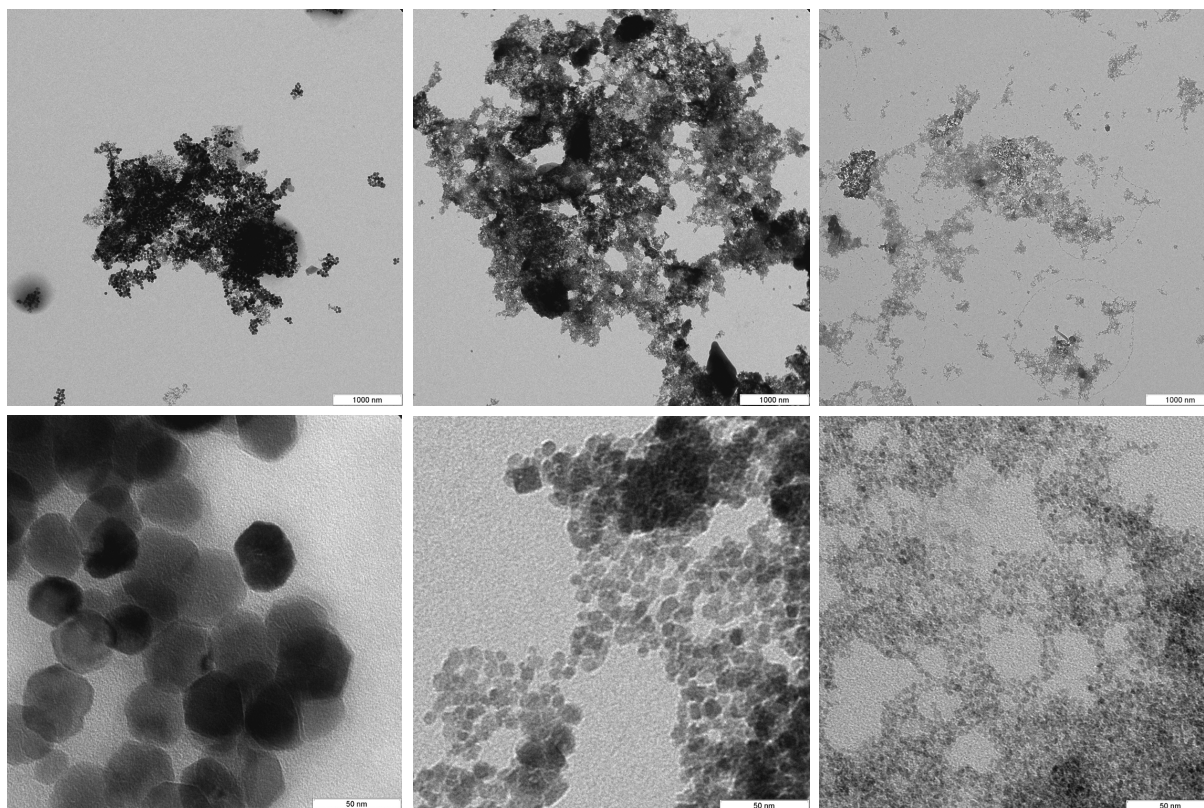


Figure S1. Cobalt oxide nanoparticles after O_2 evolution. (upper panel) aggregated particles after photocatalytic process. (lower panel) higher magnification TEM of cobalt oxide particles with no morphological changes after photocatalytic water oxidation.

XPS analysis

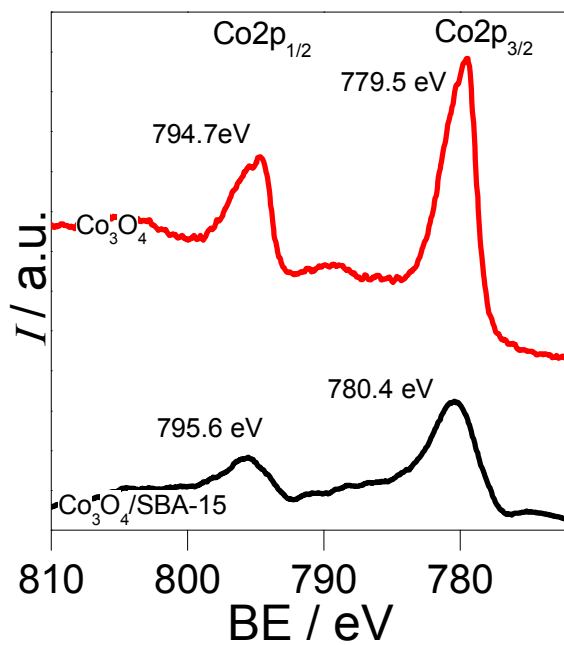


Figure S2. XPS analysis of the free cobalt oxide particles (red line) and deposited on the silica substrate (black line). Presence of silica cause shift of the $\text{Co}_{2p_{3/2}}$ peak suggesting changes in the oxidation state of the cobalt.

Co₃O₄@SBA-15 composites

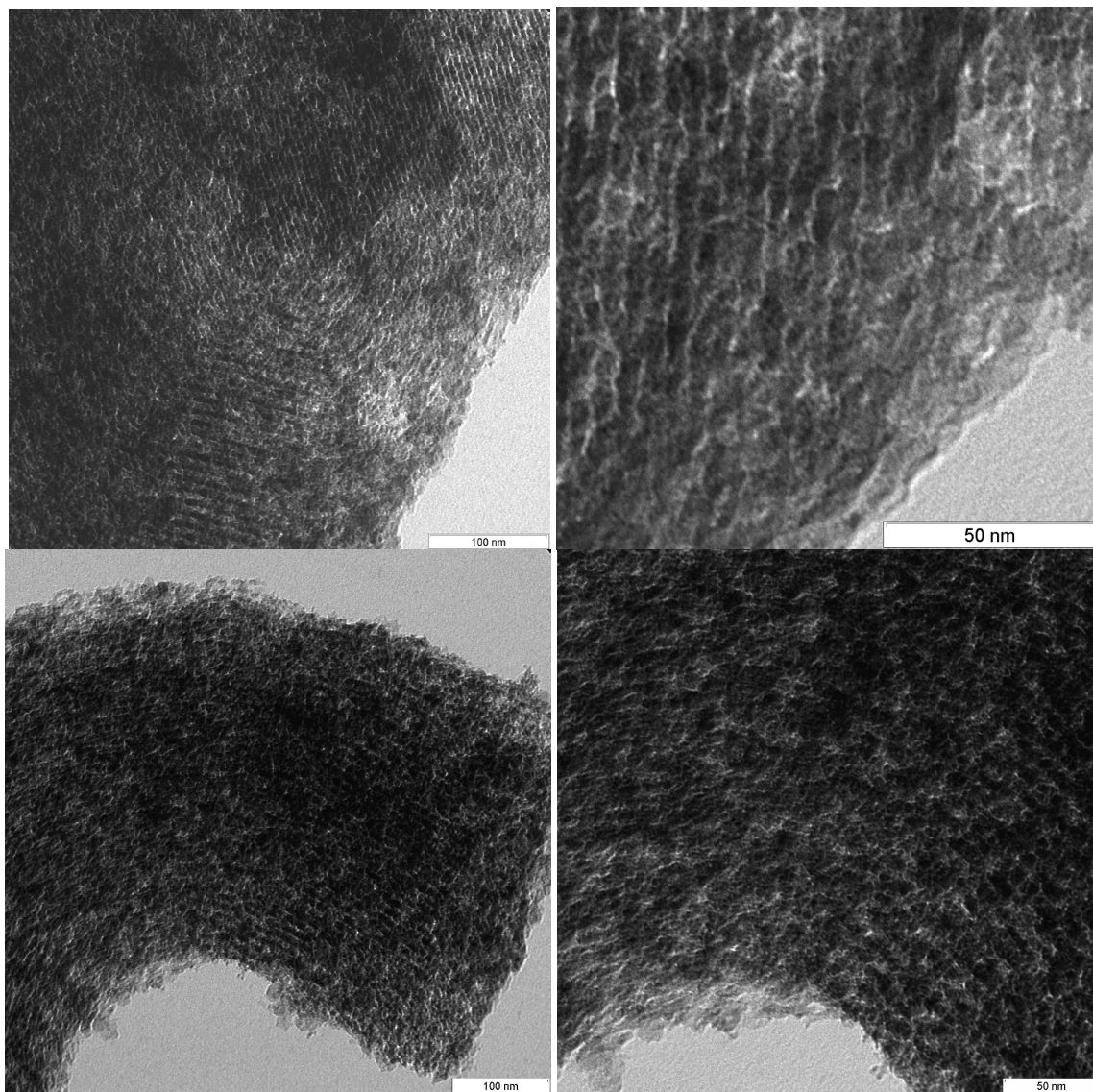


Figure S3. 3 nm Co₃O₄ @ SBA-15 silica before (upper panel) and after (lower panel) photocatalytic process. No morphological changes are observed after photocatalysis.

XRD analysis

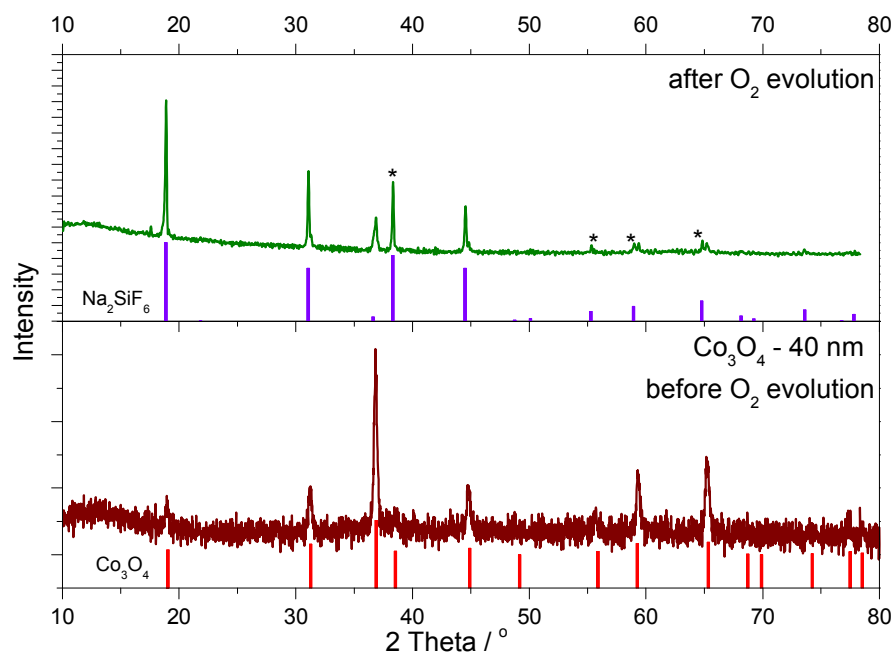


Figure S4. XRD pattern for the cobalt oxide nanoparticles before and after O_2 evolution. No structural changes are observed after reaction. Precipitated particles contain product of decomposed buffer.