Shape control of perovskite nanoparticles and its visible light activity tailored as a photocatalyst via loading surface capped pt nanoparticles

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A new nanostructured visible light active catalyst was designed from perovskite family. In the first step of the preparation, sodium niobate doped with ruthenium were synthesized by using a hydrothermal method. Various structural morphologies of niobates were achieved by adjusting the amount of doping. Hydrothermal temperature was also played a major role in the formation of different phases and morphologies. The formation of different morphologies was observed by using SEM and the crystal structures were studied with the help of XRD. From UV-Vis diffuse reflectance spectra, it is determined that 1% Ru doped niobate is actively adsorbed from the visible light spectrum. Proton exchange was carried out in aqueous hydrochloric acid to overcome the hydrophobic nature of the particles and also the preliminary step for the expansion of framework cavities. Expansion of framework cavities were achieved by shaking the H^+ exchanged niobate with TBA^+OH^- for 24 h. Breaking of some of the O—Nb bonding was achieved in mild washing with HF, followed by anchoring the surface capped Pt nanoparticles into the cavities.