

Ta and Nb-based perovskite oxynitrides : Synthesis and Characterizations

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Photocatalytic Hydrogen and Oxygen Production from water is the most ideal and powerful method for utilizing solar energy as a newable energy source. Until now on, many UV-light-driven photocatalysts; such as titanates, niobates, tantalates, have been developed. However, for a practical utilization of solar energy, Visible-light-driven photocatalysts must be developed. Nitrogen-doping (substitution) reported recently is a method of band engineering to reduce band gap energy for absorbing visible light. Oxide-based materials (UV-light-driven photocatalysts) can be transformed to (oxy)nitrides through (oxy)nitridation with thermal ammonolysis. Here we reported that Ta- and Nb-based perovskite oxynitrides could be synthesized from oxide precursor by oxynitridation with dry ammonia (gas phase). Prepared Ta- and Nb-based oxynitrides functioned as photocatalyst for water reduction and oxidation under visible light irradiation.