

Photocatalytic water splitting using Strontium niobium oxynitride under visible light irradiation

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Direct water splitting into H₂ and O₂ over bulk-type Tantalum Oxynitride (TaON) under visible light irradiation was investigated. In this study, we found that the layered-structure-perovskite-type Strontium niobium oxynitride (Sr₂Nb₂O_{7-x}N_x) has the activity of photocatalytic water splitting under visible light irradiation. Sr₂Nb₂O₇ was reported as the photocatalyst for water splitting under UV light irradiation. Sr₂Nb₂O_{7-x}N_x was synthesized from a Sr₂Nb₂O₇ precursor at 1123 K under NH₃ flow. We found that the top of the valence band of Sr₂Nb₂O_{7-x}N_x consists predominantly of N 2P orbitals with a small contribution by O 2P orbitals, and has a smaller band-gap than Sr₂Nb₂O₇ by the shifting of the top of the valence band.