

Synthesis of Tantalum Oxynitride and Tantalum Nitride for Visible Light Solar Energy Conversion

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The morphology control or composite making are important to photocatalyst material for better photocatalytic water splitting or photoelectrochemical application. The nanoparticles, nanorods, and nanotubes are intensively reported due to excellent electrons and holes transportation and large internal surface area. And the junction or composite semiconductor is good for charge separation of electrons and holes. Ta_2O_5 and tantalates work as highly active photocatalyst for water splitting. But its band gap energy is too large. TaON is known as a good photocatalyst for water oxidation under visible light. And Ta_3N_5 are also reported that it shows good stability with a band gap position appropriate for overall water splitting in visible light. Thus nano structured TaON and Ta_3N_5 will be synthesized for visible light solar energy conversion. As a test reaction, Ta_2O_5 powder is treated in ammonia gas flow. The mixed phase of TaON and Ta_3N_5 was obtained by changing the heating temperature and flow rate. After synthesizing the material, making composites and screening test with some cocatalysts will be performed.