Photocatalytic decompositon of IPA over W-doped $PbBi_2Nb_2O_9$ material under visible light irradiation

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In order to perform the study we designed and fabricated p-type and n-type materials by doping $PbBi_2Nb_2O_9$. The PBNO is an undoped, single-phase Aurivillius-phase layered perovskite photocatalyst [10], efficient for decomposition of water into O_2 or H_2 under visible light irradiation (≥420nm). For n-type PBNO we introduced W^{6+} for Nb^{5+} in the perovskite lattice by the solid state reaction method. In order to explore the effect of doping concentration, we further varied the W^{+6} concentration to make $PbBi_2Nb_{2-x}W_xO_9$ (x = 0.1 - 0.5 mol%, PBNWO). Similarly, we introduced Ti^{+4} for Nb^{+5} in the lattice of PBNO to make p-type $PbBi_2Nb_{1.85}Ti_{0.15}O_9$ (PBNTO). In addition to the desired valencies, the dopants W^{+6} and Ti^{+4} were chosen because of their similar sizes to that of Nb^{+5}. Finally we investigated photocatalytic and photoelectrochemical performance of these materials for photocurrent generation and CO_2 production from IPA under visible light irradiation (λ≥420nm).