

Photocatalytic reduction of CO₂ with H₂O to produce CH₄ on perovskite A₂SnO₆ (A = Mg, Ca, Sr, Ba)

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As is known to all, carbon dioxide(CO₂) is one of the major greenhouse gases over the past few centuries because of its generation rapidly from the combustion of fossil fuels. So, the effective utilization of CO₂ is one of the important projects in order to solve this problem. Among various ways to convert CO₂, photocatalytic reduction of CO₂ with H₂O into hydrocarbon fuels and useful chemicals is potentially a promising technology. There are various semiconductor materials have been used as photocatalysts to convert CO₂ into hydrocarbon fuel. In which, TiO₂ has been widely studied because of its good photoactivity, charge transfer potential, non-photocorrosion, biologically stable and non-toxic. However, the main disadvantages of TiO₂ are wide band gap(3.2 eV) and immediate recombination of photogenerated electron-hole pairs. In recent years perovskite based photocatalysts have gained good response for photo reduction of CO₂. In this present study, A₂SnO₆(A = Mg, Ca, Sr, Ba) perovskite was synthesized to examine the photoreduction of CO₂ with H₂O. The prepared materials were characterized using XRD, BET, UV-vis spectroscopy, PL, and CO₂-TPD techniques.