PREPARATION OF CU-LOADED SRTIO3 NANOPARTICLES AND THEIR PHOTOCATALYTIC ACTIVITY FOR HYDROGEN EVOLUTION FROM METHANOL AQUEOUS SOLUTION

Duc-Nguyen Bui, Jin Mu, Lei Wang,Shi-Zhao Kang, Xiangqing Li

TÓM TẮT:

Cu-loaded SrTiO3 nanoparticles (Cu–SrTiO3) were prepared using a simple in situ photo-deposition method and their photocatalytic activity for hydrogen evolution from methanol aqueous solution was evaluated. The results characterized with XRD, TEM, XPS and EDX indicated that the as-synthesized sample was composed of metallic Cu and cubic SrTiO3, and the metallic Cu was homogeneously loaded on the surface of SrTiO3 nanoparticles. Under UV light irradiation, Cu–SrTiO3 displayed much higher photocatalytic activity for hydrogen evolution and excellent stability in comparison with pure SrTiO3 nanoparticles. The results further confirmed that the efficient separation of photogenerated electron/hole pairs was critical for the enhanced photocatalytic activity of Cu–SrTiO3. Moreover, the rate of hydrogen evolution of 0.5 wt.% Cu–SrTiO3 is comparable with that of 0.5 wt.% Pt–SrTiO3 photocatalyst under optimum conditions, implying that the metallic Cu is an efficient alternative to Pt as a co-catalyst on SrTiO3. The high photocatalytic activity, low cost and chemical stability mean that the Cu-loaded SrTiO3 is a potential catalyst for the photocatalytic hydrogen evolution from methanol aqueous solution.