Performance of Manganese and Antimony co-doping Tin Dioxide Anodes Prepared at Different Temperatures

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In this article, the titanium based Mn-Sb co-doping SnO₂ anodes (Ti/Mn-Sb-SnO₂) prepared by the coating pyrolysis method at different annealing temperatures were investigated. The novel Ti/Mn-Sb-SnO₂ anodes did not only perform higher stability than the Ti/Sb-SnO₂ without Mn doping, but also exhibit superior capability of degrading phenol. The electrodes were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM) with energy dispersive X-Ray (EDX), polarization curve, chronopotentiometry, and phenol degradation simulation. Among all the samples, the Ti/Mn-Sb-SnO₂ electrode annealed at 550 °C performed the best catalytic stability. Moreover, the phenol removal efficiency of Ti/Mn-Sb-SnO₂ anode made at 600 °C almost reached 100% in 2h. To probe into the deep reason resulting in the better catalysis, the fluorescence spectrum method was applied to test the hydroxyl radicals produced on the surfaces of each electrodes in phenol oxidation. The results confirmed Mn-doping could promote the catalysis activities of Ti/Mn-Sb-SnO₂ electrodes.

Keywords: Dimensionally stable anodes; Antimony doped tin dioxide; Manganese; phenol degradation.

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