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Enhanced photo catalytic activity of BiOI synthesized in presence of EDTA for air purification by NO_x elimination

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B ismuth oxyiodide (BiOI) was successfully synthesized using EDTA as retarder of the reaction in aqueous medium. The synthesis was carried out at 110° by using microwave irradiation and at room temperature by simple co-precipitation of metallic salts. There was found a strong relation between the EDTA concentration used and the physicochemical properties of BiOI such as specific surface area and morphology. The photo-catalytic activity of BiOI samples was evaluated in the oxidation reaction of nitric oxide (NO) in gaseous phase under UV-Vis and visible irradiation, following the norm ISO 22,197-1. Different experimental conditions of synthesis were evaluated in order to improve the photo-catalytic activity of BiOI. Besides the EDTA concentration, the temperature of synthesis and the iodide concentration in the medium of reaction were also revised. The sample with the highest photo-catalytic activity (co-precipitation, 40% EDTA) was able to remove 98% of NO from air, showing the photo-catalyst good stability when was exposed to several cycles of use. The selectivity of the NO oxidation reaction to nitrate ions was of 78%, showing a direct reaction until the formation of innocuous NO₃- ions. The origin of the high activity of BiOI sample was good correlated with its high surface area, a low electron-hole recombination process detected by photoluminescence measurements, as well as by the presence of EDTA residual in its surface detected by XPS technique.

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