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o-Toluidine Photodetoxification By Bismuth Doped ZnO Nanopowders

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Extended Abstract

Nowadays environmental pollution has become a very diffuse topic for scientific research and several articles deal with the development of innovative techniques and materials for treatments of both wastewaters and polluted air. In this context, photocatalysis has a great potential as green technique for the depollution of several organic and inorganic toxic molecules.

Zinc oxide has been introduced in heterogeneous photocatalytic treatments as an alternative material to TiO_2, thanks to its similar properties: high photosensitivity, non-toxicity, low cost, competitive photocatalytic activity (band gap of 3.37 eV). Recently, along with their traditional application fields (*e.g.* coatings, cosmetics), ZnO nanopowders have been used as photocatalysts (second only to TiO_2) for environmental remediation both in aqueous and gas phases (Pudukudy et al., 2013 and Pifferi et al., 2014). The best performances for nanosized ZnO can be reached either modifying the strategy of synthesis or doping the material with different species, including transition metals (Mn, Cu) but also rare earth elements (La, Er) (Sin et al., 2014 and Zamiri et al., 2014). Also bismuth has been tested as dopant, proving its ability to shift the adsorption edge of ZnO (reducing the band gap of the material) to lower energy, exploiting solar light and modifying the separation rate of photoinduced charge carriers (Chandraboss et al., 2013 and Senthilraja et al., 2015). In the present paper photocatalytic mineralization of *o*-toluidine in aqueous media under UV/solar irradiation was achieved by bare and bismuth doped zinc oxide nanoparticles. By adopting different analytical approaches a reaction mechanism is proposed, explaining the differences in photodetoxification performances.

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