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Preparation and Characterization of $BaMnO_3$ Application to the Photocatalytic Oxidation of Paracetamol under Solar Light

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Abstract : $BaMnO_3$ nanoparticles were synthesized by a nitrate route. Its structure and physical properties were characterized by means of X-ray powder diffraction, radio crystallographic analysis, ultraviolet-visible absorption spectroscopy in diffuse reflectance mode, infrared spectroscopy, and electrochemical measurements. The optical study showed that barium manganese oxide presents a direct transition with band energy 2.13 eV. The electrochemical study allowed us to identify the redox peaks and the corrosion parameters. Capacitance measurement clearly showed n-type conductivity. The photodegradation of paracetamol by $BaMnO_3$ was followed by UV-visible spectrophotometry; the results were then confirmed by HPLC. $BaMnO_3$ has shown its photocatalytic efficiency in the photodegradation of 10 mg/L paracetamol under solar irradiation, with a yield of ≈ 88%. The kinetic study has shown that paracetamol degrades with first-order kinetics.

Keywords : $BaMnO_3$, photodegradation, paracetamol, electrochemical measurements, solar light
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