

Programme & The Book of Abstracts

Twentieth Annual Conference

YUCOMAT 2018

Herceg Novi, Montenegro, September 3–7, 2018

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TWENTIETH ANNUAL CONFERENCE

YUCOMAT 2018

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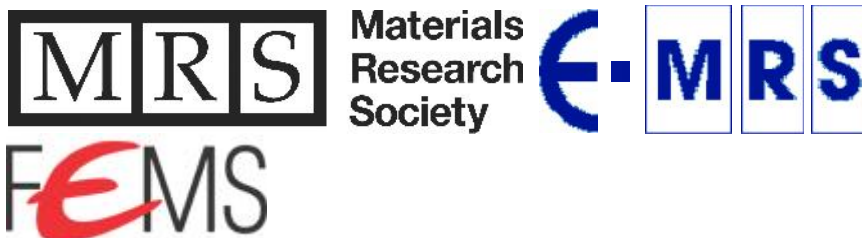
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CTAB- and pluronic F-127-assisted microwave processing of ZnO particles with modified morphology and optical properties

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Zinc oxide-based materials have a great potential to be applied as photocatalysts in the processes of removal of organic and biological pollutants from drinking and wastewaters. A major drawback of ZnO as visible-light absorber is a band energy gap of 3.37 eV, which restricts the material to absorb UV light only. This drawback can be overcome by modifying the optical absorption properties of zinc oxide particles. Different approaches have been applied to modify the visible light photocatalytic activity of ZnO materials: (1) metal and nonmetal ion doping, (2) hydrogenation, (3) the incorporation of crystalline defects in the form of vacancies and interstitials, (4) the modification of particles morphology and surface topology, etc.

In this study we investigated the influence of different surfactants on the morphology, optical properties and functionality of ZnO particles. Two different surfactants were employed during microwave processing of ZnO particles, cetyltrimethylammonium bromide (CTAB) as cationic and Pluronic F-127 as non-ionic one. The crystal structure and phase purity of the ZnO particles were determined by X-ray diffraction and Raman spectroscopy. Effects of the surfactants on particles morphology and texture properties were observed with field emission scanning electron microscopy (FE-SEM) and nitrogen adsorption-desorption isotherm, respectively. The optical properties were studied using UV-Vis diffuse reflectance and photoluminescence (PL) spectroscopy. Functionality of ZnO particles was studied due to their photocatalytic and electrochemical activities. Photocatalytic activity was examined *via* decolorization of methylene blue under direct sunlight irradiation. Electrochemical behavior of the ZnO samples as anode material was evaluated by linear sweep voltammetry in Na₂SO₄ electrolyte; the oxygen evolution kinetics were determined and compared.

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