PHOTOCATALYTIC DEGRADATION OF METHYL ORANGE IN THE PRESENCE OF ALUMINIUM-DOPED ZINC OXIDE

NUR ALIYAH ALWANI BINTI MOHD NAZAM

Final Year Project Report Submitted in
Partial Fulfilment of the Requirements for the
Degree of Bachelor Science (Hons.) Physics
in the Faculty of Applied Sciences
Universiti Teknologi MARA

JULY 2017

ABSTRACT

PHOTOCATALYTIC DEGRADATION OF METHYL ORANGE IN THE PRESENCE OF ALUMINIUM-DOPED ZINC OXIDE

Al-doped ZnO (AZO) photocatalysts with different Al concentrations (1-10 mol %) were prepared through sol-gel method and followed by drying process at 300 °C for one hour. The obtained samples were characterized by X-Ray Diffraction (XRD), Field Emmision Scanning Electron Microscope (FESEM) combined with Energy Dispersive X-Ray (EDX) and UV-Vis Spectroscopy. The XRD patterns of AZO samples were assigned to wurtzite structure of ZnO with the smallest crystallite size range from 78 - 87 nm. The doping of Al in ZnO crystal structure successfully suppressed the growth of ZnO nanoparticles confirmed by XRD patterns. The photocatalytic activities of the samples were evaluated by photocatalytic degradation of methyl orange at characteristic peak of 466 nm under UV light. The results showed that the AZO photocatalyst doped with 1 mol % Al exhibited 89 % of photocatalytic activity compared to pure ZnO which results in 69 %. The enhanced photocatalytic activity could be attributed to extended UV light absorption, inhibition of the electronehole pair's recombination and enhanced adsorptivity of methyl orange dye molecule on the surface of AZO nanopowder.

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