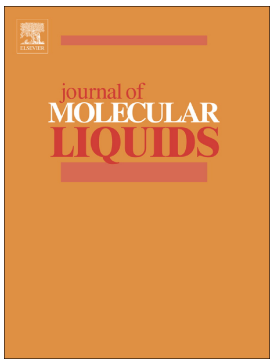

Enhanced photocatalytic activity of Ag-ZnO nanoparticles synthesized by using Padina gymnospora seaweed extract

S. Rajaboopathi, S. Thambidurai

PII: S0167-7322(18)30784-0
DOI: doi:10.1016/j.molliq.2018.04.073
Reference: MOLLIQ 8976

To appear in: *Journal of Molecular Liquids*

Received date: 12 February 2018
Revised date: 10 April 2018
Accepted date: 12 April 2018

Please cite this article as: S. Rajaboopathi, S. Thambidurai , Enhanced photocatalytic activity of Ag-ZnO nanoparticles synthesized by using Padina gymnospora seaweed extract. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Molliq(2017), doi:10.1016/j.molliq.2018.04.073

Enhanced photocatalytic activity of Ag-ZnO nanoparticles synthesized by using *Padina gymnospora* seaweed extract

S. Rajaboopathi [a], S. Thambidurai [a]*

[a] Bio-nanomaterials Research Lab, Department of Industrial Chemistry,
School of Chemical Sciences, Alagappa University,
Karaikudi-630003, Tamil Nadu, India.

ABSTRACT

In this present study, reported the *Padina gymnospora* seaweed extract mediated synthesis of Ag-ZnO nanoparticles by the chemical co-precipitation method. Thus synthesized SW/Ag-ZnO nanoparticles were characterized by FTIR, UV-Visible, HR-SEM and TEM analysis. The strong chemical bonding interactions of Zn^{2+} and Ag^{+} ions on the seaweed biomolecules were confirmed by FTIR and UV-Visible spectroscopy. The spherical and grain shaped morphology of Ag, ZnO particles intercalated on the seaweed polymer component was verified by HR-SEM and TEM analysis and their average size of the particles was obtained in 20-40 nm range. In addition, the surface area and pore volume distribution of SW/Ag-ZnO (55.14 $m^2 g^{-1}$ and 0.1830 cm^3/g) was found to be higher than SW-ZnO nanoparticles. Photodegradation and decolorization performances of the catalyst nanoparticles were tested by cationic (Methylene Blue) and anionic (Reactive Blue 198) dyes under the direct sunlight irradiations. The photocatalytic degradation activity of SW/Ag-ZnO nanoparticles were fitted to the first order reaction kinetics, the rate constant values of 0.026 and 0.024 min^{-1} obtained for the MB and RB198 dyes and the removal of 85 and 95 % degradation was achieved within the irradiation period of 30 minutes exposure than the other nanoparticles. The mineralization of MB and RB198 dyes were confirmed by Chemical oxygen demand (COD) measurements.