PHOTOCATALYTIC EFFICIENCY OF $LiInO_2$ IN DEGRADATION OF ALPRAZOLAM FROM WASTEWATERS

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Abstract

Alprazolam is a widely consumed psychiatric pharmaceutical from the benzodiazepinesgroup, thathas been continuously introduced into the environment throughwastewaters, being a potential risk to living organisms. Furthermore, alprazolam is highly resistant to photodegradation, with degradation half-time of 228 sunny days [1].

Lithium-indium oxide is a high density (5.9 g/cm^3), wide band-gap semiconductor with promising applications for scintillating detection of solar neutrinos as well as for efficient phosphorescence when doped with different rare earth ions. Here we report for the first time the photocatalytic efficiency of $LiInO_2$ powder, synthesized using a simple solid-state chemistry procedure at relatively low temperature of 700°C. Materials structure was examined by X-ray diffraction,that confirmed materials tetragonal structural form (space group: $I4_1/amd$) with no impurity phases. Optical band-gap of 3.99 eV was estimated from the diffuse-reflectance spectrum. Photocatalytic efficiencywas examined under both simulated solar and UV radiation. Photodegradation kineticsshowed $LiInO_2$ powderhas a good potentialfor UV-activated degradation of alprazolam.

References

[1] V. Calisto, M.R.M. Domingues, V.I. Esteves, Photodegradation of psychiatric pharmaceuticals in aquatic environments - kinetics and photo-degradation products, Water Res. 45 (2011) 6097–6106