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The Effect of Calcining Temperature on Photocatalytic Activity of Porous ZnO Architecture

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Abstract : Zinc oxide (ZnO) nano crystals assembled porous architecture was prepared by thermal decomposition of zinc oxalate precursor at various temperatures ranging from 400-900°C. The effect of calcining temperature on structure and morphology was examined by scanning electron microscopy (SEM), X-ray diffractometry, thermogravimetry, and BET adsorption analysis. The porous nano crystalline ZnO morphology was developed due to the release of volatile precursor products, while the overall shape of ZnO micro crystals was retained as a legacy of the precursor. The average crystallite size increased with increasing temperature of calcination from approximately 21 nm to 79 nm, while the specific surface area decreased from 30 to 1.7 m2g-1. The photo catalytic performance of prepared ZnO powders was evaluated by degradation of methyl violet 2B, a model compound. The significantly highest photo catalytic activity was achieved with powder calcined at 500°C. This may be attributed to the sufficiently well-developed crystalline arrangement, while the specific surface area is still high enough.

Keywords : ZnO, porous structure, photodegradation, methyl violet
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