

Decolouration of Orange II solutions by the active layers of Cu-doped ZnO deposited on ceramics based on mullite and zircon

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Abstract

For the preparation of purification elements in our daily life at low cost, thin layers of zinc oxide and ZnO doped with copper (0%, 4%, 6%) were deposited on pellets of ceramics constituted Cristobalite, mullite and zircon. These substrates are made from local raw materials. The thin films are prepared by sol-gel; their characterization and the study of the effect of the copper doping concentration on the structural and catalytic properties have been studied by different analytical techniques. Such as X-ray diffraction, atomic force microscope and UV-visible spectrophotometer. The catalytic characterization is carried out on Orange II where an aqueous solution of 12.5 mg / l was used with a 4W UV lamp. The results obtained show that the porous substrates consisting only of mullite-zircon with active layers of ZnO doped with 6% Cu gives an important photocatalytic activity. This important effect can be related to the high rate of open porosity in these substrates (due to the consumption of the vitreous phase by zirconia). The presence of the open porosity makes the specific surface larger and they are then filled with ZnO and CuO. The maximum degree of purification obtained is 77.76% for an improvement rate of 6 hours.

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Keywords: mullite, zircon, sol-gel, the degradation time.

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