

REMOVAL OF ROSE BENGAL DYE BY HYDROPHOBIC CARBON QUANTUM DOTS AND POLYURETHANE NANOCOMPOSITES

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Abstract

In the present study we report the removal of Rose Bengal dye by gamma irradiated nanocomposites composed of hydrophobic carbon quantum dots incorporated in the matrix of polyurethane (hCQD-PU). It is assumed that the removal is caused by the combination of two different mechanisms. First mechanism suggested is a photocatalytic degradation by light-induced production of singlet oxygen and other reactive oxygen species by gamma irradiated hCQD and second mechanism is the adsorption of the remaining Rose Bengal dye from the solution, by polymer matrix. The removal efficiency of the dye reached up to 92% for 4 h of irradiation by visible lamp. We have investigated the effect of different parameters, such as the dose of gamma irradiation applied to the nanocomposite, as well as the exposure time of the sample to the blue lamp (470 nm). The proposed material has a potential in water purification systems.