

عنوان مقاله:

Photocatalytic degradation of methylene blue dye over immobilized ZnO nanoparticles: Optimization of calcination conditions

محل انتشار:

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خلاصه مقاله:

In the present study, calcination conditions during the synthesis of zinc oxide nanoparticles were optimized using response surface methodology (RSM) based on central composite design (CCD). After that, the effect of the type of UV irradiation on the photocatalysis of methylene blue (MB) dye was studied based on the kinetic model obtained at optimum conditions. Analysis of variance (ANOVA) exhibited a reasonable high correlation coefficient between the predicted and experimental values ($R^2 = 0.95$). For a decolorization efficiency of 90%, the optimum calcination temperature and calcination time were identified to be 459 °C and 3.65 h, respectively. According to the reaction rate constant (k), the time required for the removal of MB using UVC lamps (0.027 1/min) was shorter than that of UVA lamps (0.0098 1/min), indicating higher exciting potential of the UVC irradiation for the generation of hydroxyl radicals through photocatalysis.

کلمات کلیدی:

Nanoparticles, Methylene Blue, Zinc oxide, Hydroxyl Radical, Kinetics

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