

Evaluation of efficacy of chromium oxide-doped ZnO hybrid nanoparticles under mild hydrothermal conditions and stabilized on the substrate in removal of aniline from solution

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Abstract

Background: Aniline is a matter in the chemical industry and used in various processes and its negative effects on the environment. Various methods for removal of this material has been studied. Among the different methods of water purification and sewage, photocatalytic processes as an effective technology, a good potential for removal of organic and inorganic contaminants and microbial agents of water. In this study excluded aniline photocatalytic action of zinc oxide nanoparticles doped with chromium oxide under hydrothermal conditions, and the consolidation of the headstock, its efficiency in removing these contaminants were studied.

Methods: This study was conducted in laboratory scale continuous. Firstly, zinc oxide doped with chromium oxide nanoparticles were synthesized under hydrothermal conditions, the chromium oxide as dopant and n - butyl amine was used as a surface modifier. Characterization of nanoparticles synthesized using specialized test XRD, FTIR, SEM, EDX and UV-Vis Spectroscopy was determined. Nanoparticles synthesized by thermal method of fixing the glass sandblasted and then testing SEM and EDX, the reaction in the reactor volume 1.5 liter was made. In this study, the effect of aniline concentration (150, 200 and 250mg/L), pH (5, 7, 9 and 12), reaction time (2, 4 and 6 hr) and radiation (sunlight and UV radiation) examined were. samples obtained after each step to determine the amount of residual aniline and its compounds intermediates were analyzed using GC-MS.

It also showed that the nanoparticles even after fixation and photooxidation process has not changed and the rate of removal of aniline in 93% of solar radiation, UV100% respectively.

Results: The results obtained in this study, it was found that the best times and optimum pH for the removal of aniline was 6 hours and 9. The results showed that the synthesized nanoparticles can be used to analyze the sun's UV rays are similar to aniline.

Keywords: ZnO nanoparticles, hydrothermal, photooxidation, UV, sunlight, aniline

