ABSTRACT

A thin-layer electrode in the form of Graphite/GO-ZnO anode can increase the effectiveness of ZnO photocatalysis in decolorizing a Congo red solution under UV and Visible lamps using the photoelectrocatalysis method. The research began with the synthesis of graphene oxide (GO) using the hummers method and characterized using FTIR and XRD. The synthesis of Graphite/GO-ZnO anode was carried out using the sol-gel dip-coating method and characterized using FTIR, XRD, SEM-EDX, UV-Vis DRS, and UV-Vis. The effectiveness of Graphite/GO-ZnO in decolorizing a Congo red solution was tested by placing Graphite/GO-ZnO as the anode, graphite as the cathode, and applying a cell potential. In photoelectrocatalysis, two types of lamps are used, namely UV and Visible. The FTIR results of graphene oxide (GO) show the presence of carboxyl, epoxy, carbonyl, and hydroxyl groups, while in Graphite/GO-ZnO the presence of hydroxyl, carbonyl, epoxy, and Zn-O groups is shown. The XRD results show the presence of ZnO crystal structure and the formation of graphene oxide (GO) diffraction peaks. The SEM-EDX results show the formation of ZnO with flake morphology and the distribution of ZnO and graphene oxide (GO) on the graphite surface. The UV-Vis DRS results show that the addition of graphene oxide (GO) can reduce the band gap value of Graphite/ZnO from 3.29 eV to 2.90 eV for Graphite/GO(100)-ZnO and 2.79 eV for Graphite/GO(150)-ZnO. In the photoelectrocatalysis test, the best decolorization percentage was obtained in the Graphite/GO(150)-ZnO variation of 88.71% under UV light and 95.99% under visible light

Keywords: Graphite, Graphene Oxide, ZnO, Photoelectrocatalysis, Congo Red