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ENCAPSULATION OF Ag NANOPARTICLE-CARBON COMPOSITE AND ENHANCEMENT OF VISIBLE LIGHT ZnO NANORODS PHOTODIODE

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ABSTRACT- In this paper, the effect of encapsulating silver nanoparticles (Ag NPs)-carbon composite onto zinc oxide (ZnO) nanorods (NRs) hydrothermally grown on silicon substrate is characterized and its photodiode performance studied. The composite was dissolved in acetone and drop casted onto ZnO NRs and the samples are baked on a hot plate. FESEM imaging was done and shows the top part of ZnO NRs coated with the composite and EDX testing shows the component are made of carbon as the majority and Ag the minority component. Transmission electron microscopy (TEM) shows the Ag-NPs embedded into the carbon coating. Photoluminescence (PL) spectra shows slight peak broadening of the ZnO main peak at 378 nm. Photodiode measurements shows the encapsulated nanorods has reduced photoresponse to UV light (395 nm) but more responsive to visible light (460 nm) due to creation of new energy states inside the band gap of ZnO.

Keywords: Zinc oxide, Ag-NPs-carbon composite, Visible light photodiode, Characterization.