Title: Polystyrene Embedded Silver Nanoparticles as Heavy Metals Removal in Wastewater Remediation Applicatio

Abstract: Wastewater contains numerous heavy metal such as Copper (II), Plumbum (II), Cadmium (II) and Zinc (II) that need to be treated as it can affect the environment and increase health risk to consumers either human, flora or fauna. Nanotechnology offers a new approach in dealing with removing of heavy metal from wastewater. One particular a very interesting and potential nanomaterial is polymer-metal nanocomposite as it has the potential to be synthesised as heavy metal absorber. This research focus on synthesizing polystyrene embedded (doped) with silver nanoparticles (PS-Ag NPs) as a low-cost absorber material for removing Zn heavy metals. Ag NPs was synthesized by Muraya koenigi leaves extract and PS was synthesized by nanoprecipitation method. Zn synthetic wastewater was prepared in a concentration of 10, 20 and 50 mg/l as a model for wastewater. The chemical bonding of PS-Ag NCs was determined by fourier transform infrared (FTIR) while surface topology and particle distribution was studied by atomic force microscopy (AFM). UV-Vis spectroscopy was used to analyse the absorbance value of PS-Ag NCs as well the prepared Zn synthetic wastewater. The ability of PS-Ag NCs to remove Zn heavy metals was studied using two main parameters, where the PS-Ag NCs will be used to threated synthetic waters with various pH value and contact time. The removal of Zn heavy metals by PS-Ag NPs from synthetic wastewater was found to be above 70% within

30 minutes. The optimum Zn absorption by PS-Ag NCs for both ratios of 1:3 and 1:5 of Ps-Ag NCs were at 91% at optimum conditions of pH 5 and 50 minutes contact times. This report clearly indicates PS-Ag NCs as a potential nanotechnology base advance material that is able to be used as heavy metal absorber for the application and advancement of wastewater technology.

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