Synthesis of GO-CS (Graphene Oxide-Chitosan) Microparticle Composite as Pb (II), Zn (II), and Mn (II) Adsorbent

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Several types of heavy metals such as lead, zinc, and manganese have high toxicity at high levels. Therefore, it is necessary to have an environmentally friendly adsorbent to be used in a filtration process. The aim of this research is to make heavy metal adsorbent Pb, Zn, and Mn from chitosan and graphene. The research method was first carried out by testing chitosan's ability to adsorb lead. The GO-CS composites were synthesized with variations in chitosan mass. Adsorption was conducted with variations in contact time of 60, 120, and 180 minutes, at a pH level of 3.5-4.5, then the composite is homogenized with an ultra turrax homogenizer. Composite morphology was analyzed using a FE-SEM (1000x, 2500x), with further analysis by a FTIR. The simulated water adsorption of heavy metals Pb, Zn, and Mn was analyzed by AAS and the data analyzed using the Langmuir and Freundlich Equations. Hypothesis testing shows the initial concentration of simulated water is 22.78 ppm and the highest final concentrations after composite addition was 17.36; ppm with the highest adsorption effectiveness of 44.90%. The best adsorption effectiveness of lead, zinc, and manganese was 99% (GO-CS 1, GO-CS 2, and GO-CS 3), 88.21% (GO-CS 2), and 50.73% (GO-CS 1). FE-SEM analysis indicates composite with the smoothest morphology has a stronger bond. The presence of an amide bond shows a successful synthesis. It can be concluded that GO-CS composites have successfully been formed, and were able to adsorb heavy metals.

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