INTISARI

STUDI ADSORPSI LOGAM Co(II), Cu(II), DAN Ni(II) DALAM LIMBAH CAIR BUATAN MENGGUNAKAN ADSORBEN NANOPARTIKEL MAGNETIK Fe_3O_4 DAN $ZnFe_2O_4$

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Telah berhasil dilakukan studi adsorpsi logam Co(II), Cu(II), dan Ni(II) dalam limbah cair buatan menggunakan adsorben nanopartikel magnetik Fe_3O_4 dan $ZnFe_2O_4$. Nanopartikel Fe_3O_4 dan $ZnFe_2O_4$ disintesis menggunakan metode kopresipitasi. Pengaruh suhu (30^0C, 60^0C, 90^0C, 120^0C, dan 150^0C) ,dan lama pengadukan (10 menit, 60 menit, dan 120 menit), serta perbandingan efektivitas adsorben nanopartikel Fe_3O_4 dan $ZnFe_2O_4$ dilakukan pada penelitian ini. Adsorpsi dalam pengaruh suhu untuk adsorben nanopartikel Fe_3O_4 menunjukkan penurunan adsorpsi. Adsorpsi maksimum terjadi pada suhu rendah (30^0C) dengan persentase adsorpsi logam Co(II), Cu(II), dan Ni(II) masing-masing sebesar 20,34%, 88,90%, dan 22,86%. Pada adsorben nanopartikel $ZnFe_2O_4$ terjadi kenaikan adsorpsi Adsorpsi maksimum terjadi pada suhu tertinggi (150^0C) dengan persentase adsorpsi logam Co(II), Cu(II), dan Ni(II) masing-masing sebesar 28,90%, 100%, dan 29,40%. Pada pengaruh lama pengadukan terhadap adsorpsi logam menggunakan kedua adsorben tampak mengalami penurunan adsorpsi. Adsorpsi logam Co(II), Cu(II), dan Ni(II) oleh adsorben $ZnFe_2O_4$ lebih efektif dibandingkan Fe_3O_4 karena memiliki ukuran butir yang lebih kecil. Dengan demikian, adsorben nanopartikel magnetik Fe_3O_4 dan $ZnFe_2O_4$ dapat digunakan untuk mengadsorpsi logam Co(II), Cu(II), dan Ni(II).

Kata Kunci : adsorpsi, Co(II), Cu(II), Ni(II), adsorben.

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ABSTRACT

STUDY ON ADSORPTION OF Co(II), Cu(II), AND Ni(II) IN ARTIFICIAL WASTE WATER USING ADSORBENT OF Fe_3O_4 AND $ZnFe_2O_4$ MAGNETIC NANOPARTICLES

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Adsorption studies of Co(II), Cu(II), and Ni(II) in artificial wastewater using Fe_3O_4 and $ZnFe_2O_4$ magnetic nanoparticles adsorbents have been succesfully done. Fe_3O_4 and $ZnFe_2O_4$ nanoparticles was synthesized using coprecipitation method. The Effect of temperature (30°C, 60°C, 90°C, 120°C, and 150°C), and stirring time (10 minutes, 60 minutes, and 120 minutes), and the comparative effectiveness of adsorbent Fe_3O_4 and $ZnFe_2O_4$ nanoparticle was performed in this study. Effect of temperature in adsorption study of Fe_3O_4 nanoparticle adsorbent have showed a decrease in adsorption with maximum adsorption occurs at low temperature (30°C) with the percentage of metal adsorption Co(II), Cu(II), and Ni(II) was 20.34%, 88, 90%, and 22,86%, respectively. The effect of temperature in adsorption study of $ZnFe_2O_4$ nanoparticle adsorbent have showed increase in adsorption, maximum adsorption occurs at the highest temperature (150°C) with the percentage of metal adsorption Co(II), Cu(II) and Ni (II) was 28,90%, 100% and 29,40% respectively. While the influence of difference in stirring time at metal adsorption in both adsorbent have showed decrease in adsorption. Adsorption of Co(II), Cu(II), and Ni (II) on adsorbent $ZnFe_2O_4$ more effective than Fe_3O_4 because it has a smaller on particle sizes. Thus, the adsorbent of Fe_3O_4 and $ZnFe_2O_4$ magnetic nanoparticles can be used to adsorp of Co (II), Cu (II), and Ni (II).

Keywords: adsorption, Co (II), Cu (II), Ni (II), adsorbents.