Pengembangan komposit magnet bentonit merangin jambi sebagai adsorben kation Cd2+ = Development of bentonite magnetic composite of merangin jambi as an adsorbent of Cd2+ cation

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Abstrak

Bentonit asal Merangin Jambi telah dimodifikasi menjadi komposit magnet bentonit dengan menggunakan prekursor garam besi dalam suspensi bentonit melalui proses pertukaran ion dan presipitasi. Komposit dibuat dengan memvariasikan perbandingan berat bentonit dengan oksida besi dan perbandingan mol Fe(III) dengan Fe(II). Komposit yang dibuat dengan Fe(III) dan Fe(II) bersifat ferimagnetik sedangkan komposit yang dibuat dari Fe(III) dan Fe(II) saja bersifat antiferomagnetik. Produk hasil modifikasi dikarakterisasi dengan X Ray diffraction (XRD), Atomic Absorbtion Spectroscopy (AAS), Scanning Electron Microscope-Energy Dispersive X ray Spectroscopy (SEM-EDS), Vibrating Sample Magnetometer (VSM) and Ultraviolet Visible (UV-Vis). Komposit magnet dengan daya serap terhadap logam Cd(II) tertinggi dengan komposisi bentonit dan oksida besi 2 : 1 dan perbandingan Fe(III) dengan Fe(II) 2 : 1 sedangkan komposit dengan sifat kemagnetan terbesar dengan komposisi 1 : 2 antara bentonit dan oksida besi dan 1 : 1 antara Fe(III) dan Fe(II). Pemberian gelombang ultrasonik setelah terbentuknya oksida besi belum berpengaruh secara signifikan terhadap peningkatan daya adsorpsi dan sifat kemagnetan komposit. Komposit yang telah menyerap logam Cd(II) dapat terambil kembali sebanyak 85,69% dan dapat diregenerasi menggunakan NaCl dengan kemampuan regenerasi 39,61%.

.....Bentonite from Merangin Jambi has been modified into a composite magnetic bentonite using an iron salt precursors in a bentonite suspension through a process of ion exchange and precipitation. Composites was made by varying the weight ratio of bentonite with iron oxide and the mole ratio of Fe (III) to Fe (II). Composites made with Fe(III) and Fe(II) are ferrimagnetic while the composite prepared from Fe (III) or Fe (II) alone is antiferromagnetic. Modification products were characterized using X Ray diffraction (XRD), Atomic Absorbtion Spectroscopy (AAS), Scanning Electron Microscope-Energy Dispersive X ray Spectroscopy (SEM-EDS), Vibrating Sample Magnetometer (VSM) and Ultraviolet Visible (UV-Vis). The highest Cd(II) adsorption from aqueous solution is given by magnetic composite prepared from bentonite to iron oxide ratio of 2: 1 and the ratio of Fe(III) to Fe(II) 2: 1. On the other hand, the composite with the highest magnetic properties is provided from the preparation using the ratio of 1:2. between bentonite and iron oxides, and ratio of 1: 1 between Fe(III) and Fe(II). The ultrasonic treatment to the mixture after iron oxide was formed showed no significant effect to the increase of adsorption and magnetic properties. The composite that has been adsorb Cd(II) ions can be drawn back as much as 85.69% and can be regenerated using NaCl with regeneration ability to 39.61%.