عنوان مقاله:

Preparation and investigation of M-MWCNT nanocomposite by hydrothermal method for Pb(II) ions adsorption

محل انتشار:

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خلاصه مقاله:

In this present work, MWCNTs modified NiFe۲O۴ NPs (M-MWCNT) were successfully fabricated based on a hydrothermal route, and then utilized to Pb(II) sorption from an aqueous solution. The M-MWCNT was characterized and analyzed by SEM, TEM, FTIR, XRD, and VSM techniques. TEM image demonstrated that the size of NiFe۲O۴ nanoparticles in the structure of MWCNT was ۲۰ nm. VSM results indicated that the M-MWCNT with saturation magnetization (Ms) value of ۷ emu/g would have a fast magnetic response. According to X-ray data the average crystal sizes of the pure NiFe۲O۴ and M-MWCNT are ۲۱.۶۲ and ۷.۲۵ nm, respectively. The sorption kinetics, isotherms, thermodynamic and regeneration performance for lead ((Pb(II)) ions were evaluated. The M-MWCNT can effectively remove Pb(II) from aqueous solution at optimum pH of ۵.۵. Based on the Langmuir model, the maximum saturated adsorbed amount (qmax) of Pb(II) was up to ۸۵.۱۲ mg/g. The kinetic characteristic was appropriate for pseudo ۱st order model expression, and the isothermal characteristic can be described via Longmuir model. The data obtained from the thermodynamic study show that the Pb(II) sorption using M-MWCNT nanocomposite was a .spontaneous, exothermic and physisorption process with a good regeneration performance

کلمات کلیدی:

NiFe۲O۴NPs, nanocomposite, MWCNT, Lead (II) sorption, qmax