عنوان مقاله:

Preparation and Characterization of NanoCellulose-Based Polyaniline Composite to Remove Nickel (II) Ions from Industrial Wastewater: Isotherm, Kinetic and Thermodynamic Modeling

محل انتشار:

ششمین کنگره ملی تحقیقات راهبردی درشیمی و مهندسی شیمی با تاکید بر فناوری های بومی ایران (سال: 1398)

تعداد صفحات اصل مقاله: 19

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خلاصه مقاله:

In the present study, we synthesized nanocellulose-based Polyaniline(PANI/NC) composite evaluated as a novel and efficient adsorbent to remove Nickel (II) ions from aqueous solutions. Characterization instruments such as SEM, TGA, BET and FTIR were used to verify the morphology and size of the synthesized composite, confirm the polyaniline polymer coating on the surface of the NC nanoparticles, study the thermal stability of the PANI/NC composite, determine the exact size of the particles with the purpose of determining the effective adsorbent surface and confirm the fabrication of the PANI/NC composite, respectively. To record the adsorption studies and determine the amount of Nickel (II) ions in solution, flame Atomic Absorption Spectrometry, (FAAS) was used. The parameters affecting the removal of Nickel (II) ion included pH, adsorbent amount and optimal contact time were investigated. The optimal pH, adsorbent amount and contact time obtained in pH=8, 0.01 g and 60 minutes, respectively. The equilibrium data obtained from the adsorption of Nickel (II) on PANI/NC adsorbent showed that Langmuir isotherm had better results compared to Freundlich isotherm. The maximum Nickel (II) adsorption capacity on the PANI/NC composite was obtained to be at 99 mg/g. Kinetic studies showed that the adsorption process follows the pseudo-second-order kinetic equation. Moreover, thermodynamic studies showed that the process of Nickel (II) adsorption on the PANI/NC composite is spontaneous and endothermic. Finally, industrial waste water samples (industrial complex, .MDF, foil, and corrugation company) have been used to remove of the Nickel (II) ions from the real samples

کلمات کلیدی:

.Nano-cellulose, Polyaniline, Real Sample, Isotherm, Spontaneous