University of Belgrade
Technical Faculty in Bor

6th INTERNATIONAL STUDENT CONFERENCE ON TECHNICAL SCIENCES

BOOK OF ABSTRACTS

Students from the Technical Faculty in Bor paid a visit to the open pit coal mine Drmno and the cooper open pit Veliki Krivelj, Serbia

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Saša Stojadinović
Ljubiša Balanović

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NICKEL REMOVAL FROM AQUEOUS SOLUTION USING COMPOSITE BASED ON MAGNETITE/EXPANDED VERMICULITE

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Abstract

Heavy metal presence in aquatic ecosystems has a huge impact on almost all the living [1]. Problem such as this have to be lessened or eliminated if it is possible. Facile and efficient method for decreasing pollutant concentration from water solutions is by adsorption [2]. In this work raw expanded vermiculite (REV) is utilized as carrier of magnetite microcrystals. This modification of the REV was done by ultrasound and consecutive precipitation of magnetite particles on its surface. This composite is characterized using further methods: X–Ray Diffraction (XRD), Scanning Electron Microscopy(SEM), Fourier Transformed Infra-Red (FTIR), specific surface area (using BET methodology) and Cation Exchange Capacity(CEC) and its adsorption properties are checked. Considering the structure, CEC and specific surface area this material has moderate adsorption parameters. For example, batch adsorption on 35 ^{o}C adsorbent accomplished capacity of19 mg Ni/g and 65.8 % removal of Ni for 90 minutes of adsorption is done on 45 ^{o}C are done with S/L ratio of 1,33 g/L. Adsorption kinetics followed pseudo–second order, as exceptedwith equilibrium capacity of 14.27 mg Ni/g and rate constant of sorption of 0.00594 g/(mg min). Isotherm showed the best correlation with Freundlich isotherm model and somewhat poor for Langmuir isotherm. Gibbs free energy decreases with temperature increase showed that the adsorption process is endothermic so chemisorption is the mechanism responsible for nickel removal.

***Keywords**: nickel removal, expanded vermiculite, magnetic adsorbents, mineral composite*

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