

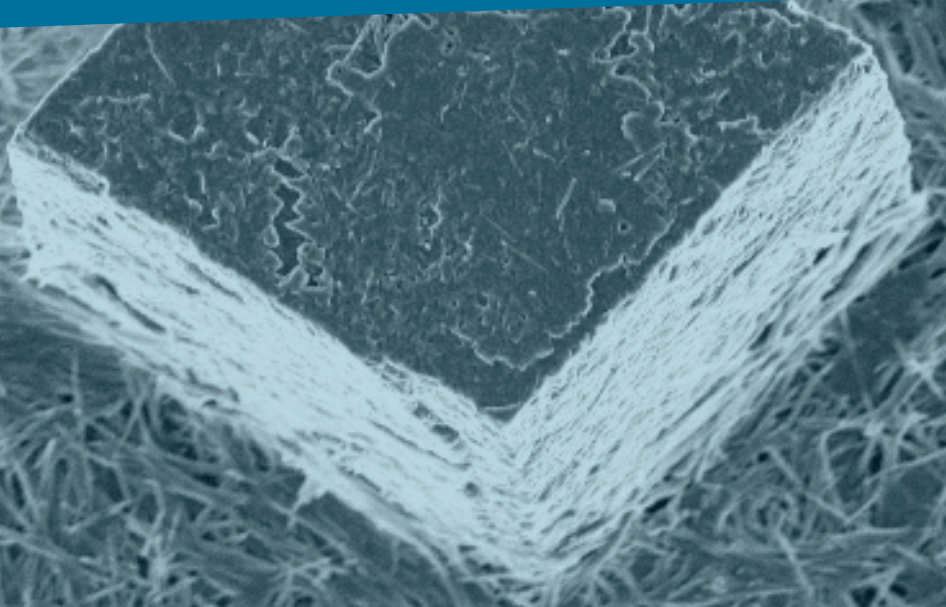
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Volume 7



XVI INTERNATIONAL CLAY CONFERENCE



XVI
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ICC 2017

Granada, Spain
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ABSTRACTS

VOLUME 7



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THE REMOVAL OF NICOTINE FROM AQUEOUS SOLUTION BY ADSORPTION ONTO MONTMORILLONITE

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Wastewaters polluted with nicotine have been classified as toxic and hazardous by European Union Regulations [1]. Using montmorillonite as nicotine adsorbent has several advantage to other methods and/or adsorbents since montmorillonite is an efficient adsorbent and at the same time natural, widely available at relatively low cost. In this work montmorillonite (SWy-2 purchased from The Source Clays Repository - The Clay Minerals Society) was used for nicotine adsorption experiments. UV-Vis spectroscopy ($\lambda_{\max}=261$ nm) was used for measuring the nicotine concentration and adsorption was carried out at pH=9.26. The estimated equilibrium time was 60 min. The adsorption obeyed the pseudo-second-order-kinetics. The adsorption isotherms were obtained for initial concentration range of nicotine from 1×10^{-4} to 2×10^{-3} mol dm⁻³ and temperature range was between from 25 and 55 °C. The obtained isotherms were fitted with Langmuir, Freundlich and Sips' models. For all investigated temperatures the results were best described with Sips' model indicating that adsorption occurred on heterogeneous surface with defined number of active sites [2]. The Gibbs free energy (ΔG) values calculated for the experimental data suggested that adsorption of nicotine onto montmorillonite was spontaneous, while the value of $\Delta H=19.0$ kJ mol⁻¹ was associated with endothermic process [3]. The result obtained for maximum adsorption capacity of SWy-2 in this study ($Q_{\max}=0.275$ mmol g⁻¹) is comparable with data referred in literature [4], while at optimal pH=6 the Q_{\max} of 0.713 mmol g⁻¹ was achieved. The obtained results suggest that montmorillonite can be regarded as promising adsorbent for nicotine removal from aqueous solutions.

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