

## **Stability of chromium compounds immobilized on organo-zeolites**

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Surfactant-modified minerals are widely used for the sorption of anionic forms of contaminants, including chromium compounds. The growing emphasis on environmental protection and economic aspects leads to increased interest in the possibility of regeneration and reuse of the sorbent. The paper attempts to determine the regeneration potential of the synthesized organo-zeolites after the sorption of Cr(III) and Cr(VI) by conducting cycles of sorption-desorption of chromium using desorbing solutions. Hexadecyltrimethylammonium bromide (HDTMA) was used to modify the synthetic zeolite Na-P1 and Na-X derived from fly-ash, obtaining a surface coverage of 1.0 external cation-exchange capacity (ECEC). Several desorbing solutions were used, such as KOH, KNO<sub>3</sub>, Na<sub>2</sub>CO<sub>3</sub>, K<sub>2</sub>HPO<sub>4</sub>, NaHCO<sub>3</sub>, NaCl, CH<sub>3</sub>COONa, K<sub>2</sub>SO<sub>4</sub>, Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub>. During the five sorption-desorption cycles, the ability to Cr(III) and Cr(VI) of used solutions desorption decreased with the simultaneous activation of the sorbent, increasing its sorption capacity. The solutions showed similar properties and have different abilities to chromium desorption and the same of the sorbent regeneration potential. The reacted organo-zeolites were analyzed using X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM). The conducted experiments proved the possibility of effective regeneration of HDTMA-modified zeolites using desorbing solutions. Activation of the sorbent surface may be caused by the development of the sorbent surface under the influence of aggressive alkaline desorbing solutions, resulting in a higher number of active centers available for surfactant molecules, thus increasing the modified surface with high affinity to chromate ions.

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