Microstructural characteristics and adsorption potential of a zeolitic tuff–metakaolin geopolymer

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\begin{abstract}
The aim of this work is to investigate the microstructural characteristics and the adsorption potential of zeolitic tuff–metakaolin (ZM) geopolymers. For the identification of microstructure, X-ray diffraction (XRD) and scanning electron microscope (SEM) analyses were used. XRD showed that mordenite, a major zeolite mineral, disappeared upon geopolymerization, while SEM showed that ZM-geopolymers exhibit a uniform porous matrix consisting of nanoparticles (~40 nm). The adsorption efficiency of ZM-geopolymers was assessed using solutions containing 250 mg/L copper. The experimental results show that the maximum adsorption efficiency (7.8 mg Cu\textsuperscript{2+}/g of adsorbent) is observed at an initial zeolitic tuff/metakaolin ratio of 0.5 which indicates that ZM-geopolymers can be used in environmental applications including the clean-up of industrial effluents and wastewaters.

\textit{Keywords}: Geopolymers; Zeolitic tuff; Metakaolin; Adsorption
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