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Removal of copper by organo-mineral composite sorbents infused with hydroxide or sulfide based active phase

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Abstract

Research has been carried out on copper(II) sorption by composite organo-mineral sorbents based on cation resin KU-2×8 with hydroxide and sulfide based active phase with structures as follows: KU-2×8-$Fe(OH)_3$, KU-2×8-$Sn(OH)_2$, KU-2×8-$Sn(OH)_4$, KU-2×8-$Ti(OH)_3$, KU-2×8-CuS, KU-2×8-ZnS, KU-2×8-PbS. There have been identified the number and strength of ionic groups within composite sorbents, and determined the nature of active phase distribution, the size of its particles, the composite sorbents elemental composition. It is shown that the full dynamic adsorption capacity of composite sorbents for copper(II) exceeds the capacity of cation resin KU-2×8, reaching 10.9 mEq/g while maintaining high kinetics of the sorption process. Experiments were conducted on copper removal from ammonia etching process in the manufacture of printed circuit boards.