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Study on ion exchange property of removing Mn^{2+} and Fe^{2+} in groundwater by modified zeolite

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ABSTRACT

This study selects two types of modified zeolites used as the ion exchanger to treat the groundwater for removing Fe^{2+} and Mn^{2+}, the column experiments of modified zeolites are conducted, the performance of ion exchange and regeneration of modified zeolites are investigated, and the operation parameters and regeneration conditions are established. The results illustrate that the modified zeolites have excellent performance on removal of Fe^{2+} and Mn^{2+}, the effluent of modified zeolites contains 8×10^{-3} mg/l Fe^{2+} and no content of Mn^{2+}. The flow rate and initial concentration of Fe^{2+} and Mn^{2+} affect the effective cation exchange capacity of modified zeolites. The flow rate has no obvious impact on the performance of modified zeolite for removing Fe^{2+} and effects sharply the performance of modified zeolite for removing Mn^{2+}, the flow rate is 30 m/h for modified zeolite for removing Fe^{2+} and 20 m/h for modified zeolite for removing Mn^{2+}. And solution concentration influences the effective capacity of both of the modified zeolites. The cation exchange capacity of zeolite regeneration by sodium chloride (NaCl) is twice times than hydrochloric acid (HCl) for removing Fe^{2+} and NaCl is also regeneration agent for zeolite for removing Mn^{2+}. The dosage of NaCl solution for regeneration of zeolite to remove Fe^{2+} is 0.92 l/(mol/l) and the ratio of dosage of NaCl and the effective capacity is 17.1, the dosage of NaCl solution for regeneration of zeolite to remove Mn^{2+} is 0.92 l/(mol/l) and the ratio of dosage of NaCl and the effective capacity is 19.9, respectively.

Keywords: Fe^{2+}; removal; Mn^{2+}; removal; Modified zeolites

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