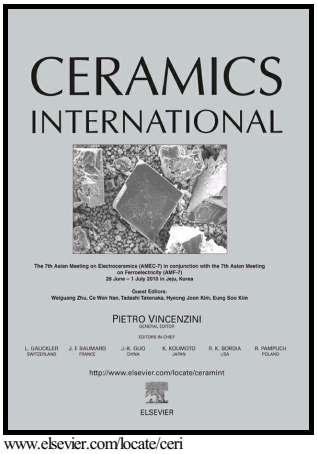


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# Magnesium ferrite nanoparticles as a magnetic sorbent for the removal of $Mn^{2+}$, $Co^{2+}$, $Ni^{2+}$ and $Cu^{2+}$ from aqueous solution

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**Abstract**

The aim of this research was to prepare magnesium ferrite ($MgFe_2O_4$) magnetic nanoparticles and to investigate their sorption characteristics towards $Mn^{2+}$, $Co^{2+}$, $Ni^{2+}$, $Cu^{2+}$ ions in aqueous solution. $MgFe_2O_4$ was synthesized by glycine-nitrate combustion method and was characterized by low crystallinity with crystallite size of 8.2 nm, particle aggregates of 13–25 nm, BET surface area of 14 $m^2/g$ and pore size of 8.0 nm. Sorption properties of $MgFe_2O_4$ towards $Mn^{2+}$, $Co^{2+}$, $Ni^{2+}$, $Cu^{2+}$ ions were studied using one-component model solutions and found to be dependent on metal ions concentration, contact time, pH and conditions of regeneration experiment. The highest sorption capacity of $MgFe_2O_4$ was detected towards $Co^{2+}$ (2.30 mmol $g^1$) and $Mn^{2+}$ (1.56 mmol $g^{-1}$) and the lowest towards $Ni^{2+}$ (0.89 mmol $g^{-1}$) and $Cu^{2+}$ (0.46 mmol $g^{-1}$). It was observed that sorption equilibrium occurs very quickly within 20–60 min. The $pH_{zpc}$ of sorbent was calculated to be 6.58. At studied pH interval (3.0–7.0) the sorption capacity of $MgFe_2O_4$ was not significantly affected.