

Supplemental materials

Figures

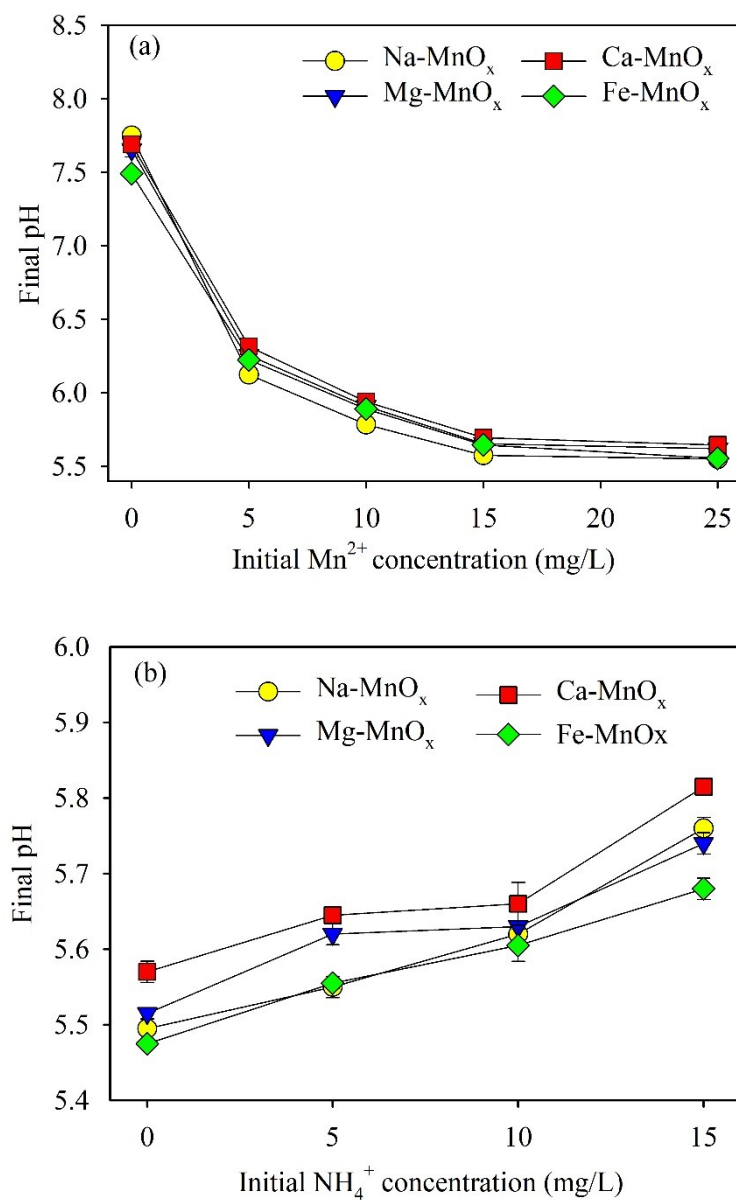


Fig.S1 The final pH in (a) ammonium removal at different initial concentration of Mn²⁺ and (b) Mn²⁺ removal at different initial concentration of NH₄⁺.

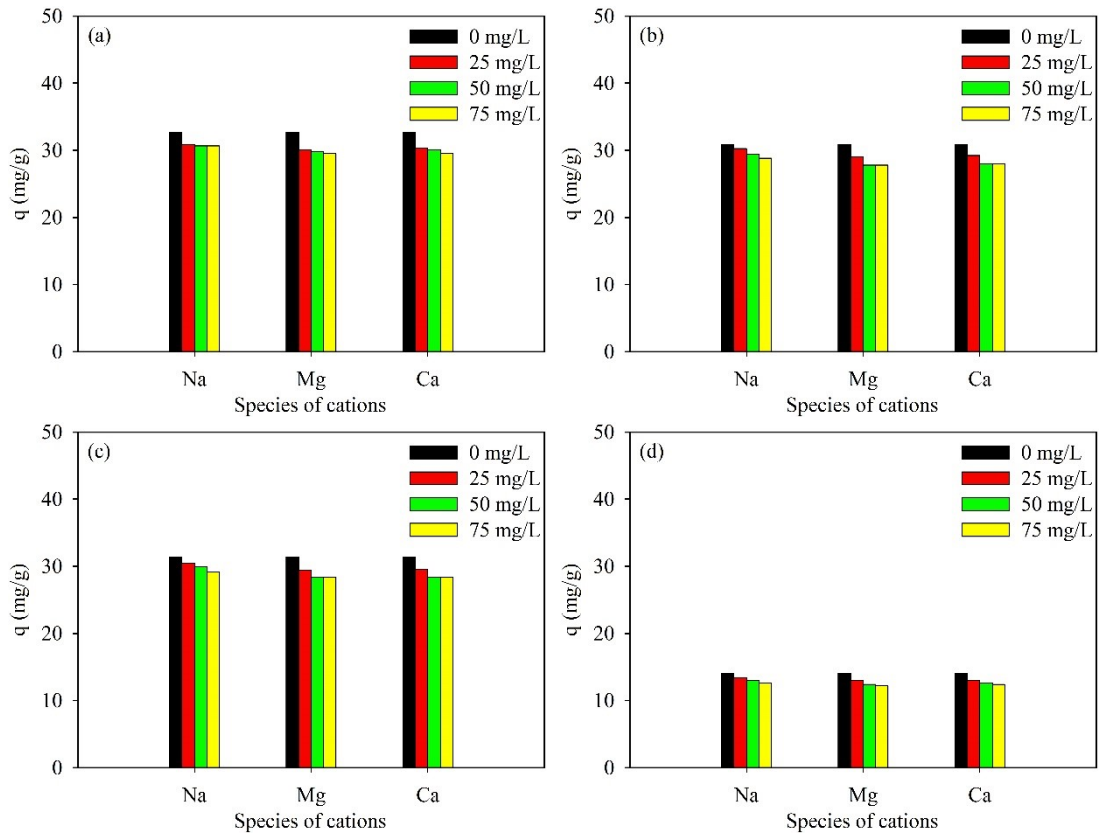


Fig.S2 Effects of different cations on Mn^{2+} adsorption of (a)Na-MnO_x, (b)Mg-MnO_x, (c)Ca-MnO_x and (d)Fe-MnO_x.

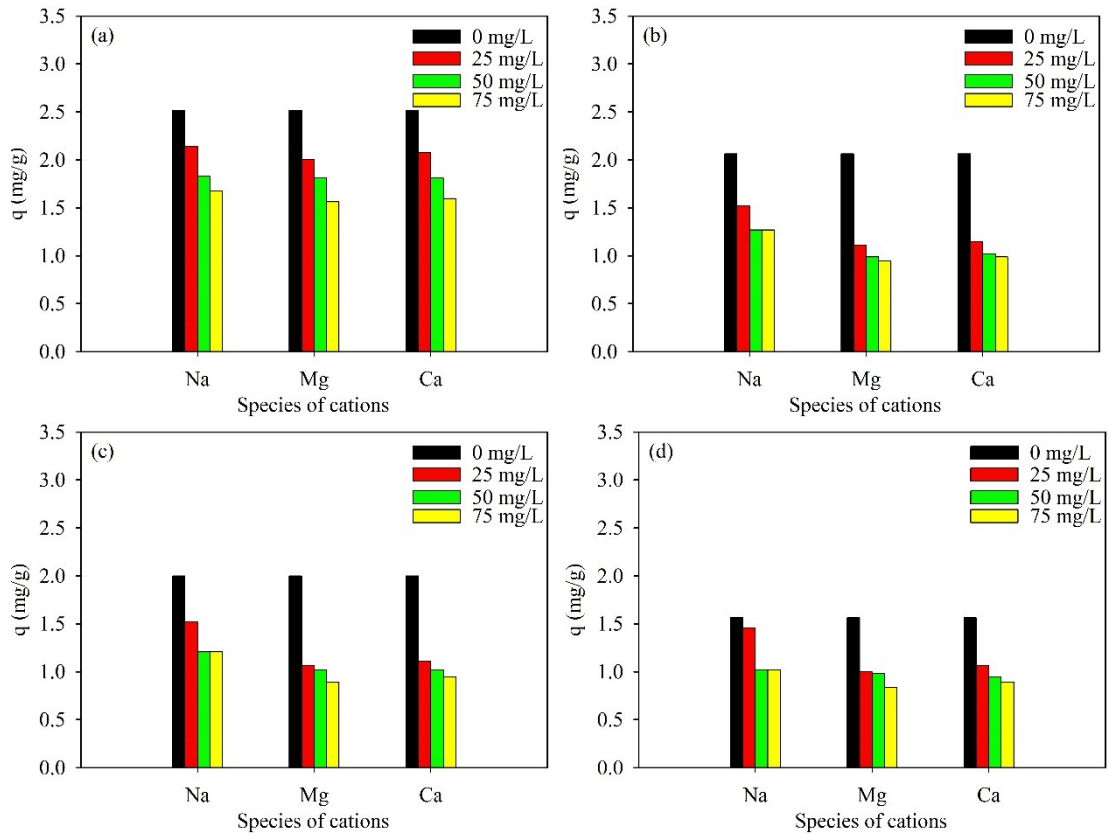


Fig.S3 Effects of cations on NH_4^+ adsorption of (a)Na- MnO_x , (b)Mg- MnO_x , (c)Ca- MnO_x and (d)Fe- MnO_x .

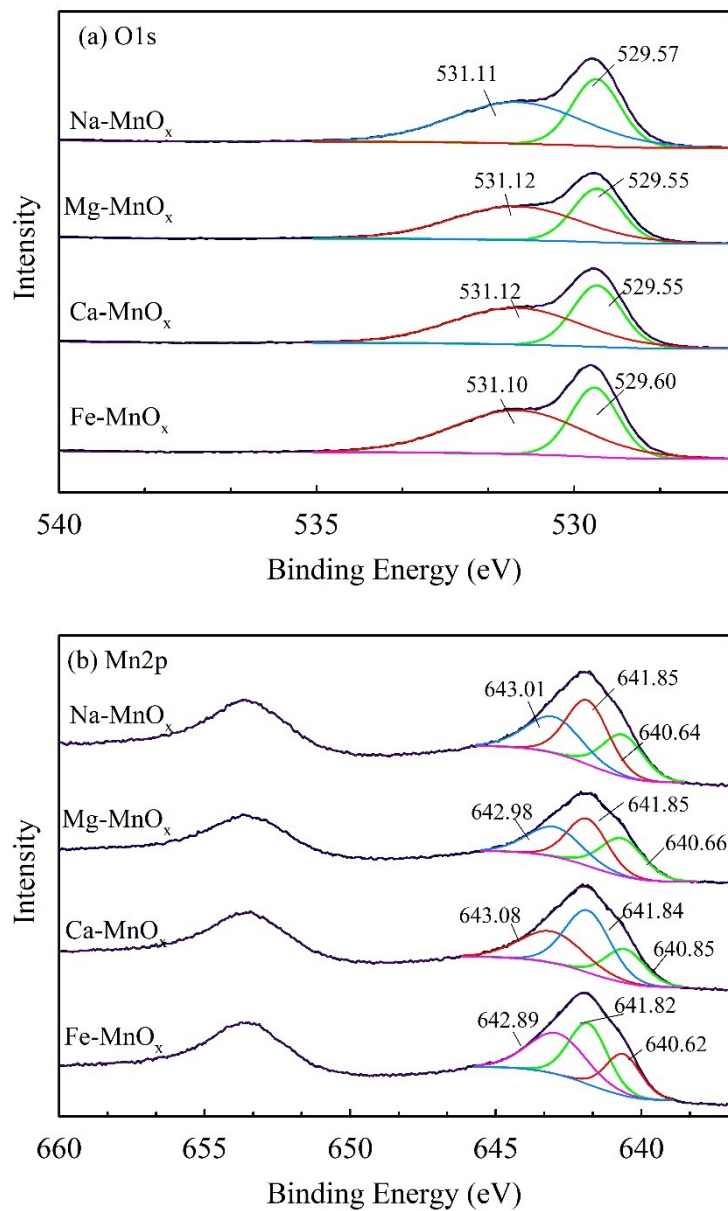


Fig.S4 XPS profiles of O1s and Mn2p in manganese oxides after the reaction: (a) O1s, (b)Mn2p

Tables

Table S1 Atomic percentage of different species of O and Mn in manganese oxides after the reaction

Species of the oxides	Species of O (%)			Species of Mn (%)		
	O _{latt}	O _{ad}	O _s	IV	III	II
Na-MnO _x	37.33	62.67	/	31.21	41.99	26.8
Mg-MnO _x	37.70	62.30	/	31.36	36.80	31.84
Ca-MnO _x	38.90	61.10	/	32.31	45.85	21.83
Fe-MnO _x	36.76	63.24	/	38.31	38.06	23.63