Supplementary Material

Adsorption isotherms, kinetics and thermodynamic
1. Adsorption Isotherms

**Fig. S1** Langmuir adsorption isotherm for Crvi adsorption onto the surface of α-MnO\textsubscript{2}-NH\textsubscript{2}-RGO at different temperatures.
Fig. S2. Freundlich adsorption isotherm for Cr$^{6+}$ adsorption onto the surface of α-MnO$_2$-NH$_2$-RGO at different temperatures.
Fig. S3. D-R adsorption isotherm for Cr$^{6+}$ adsorption onto the surface of α-MnO$_2$-NH$_2$-RGO at different temperatures.
3. Adsorption Kinetics

**Fig. S4.** Plot of the pseudo-first-order kinetic model for Cr$^{6+}$ adsorption onto the surface of $\alpha$-MnO$_2$-NH$_2$-RGO at different initial solution concentrations.
Fig. S5. Plot of the pseudo-second-order kinetic model for Cr$^{6+}$ adsorption onto the surface of $\alpha$-MnO$_2$-NH$_2$-RGO at different initial solution concentrations.
4. Adsorption Thermodynamic

**Fig. S6.** Plots of $\ln C_0/C_e$ versus $C_s$ at various temperatures.
Fig. S7. Plots of lnK₀ versus 1/T
Fig. S8. The XRD of composite before and after adsorption