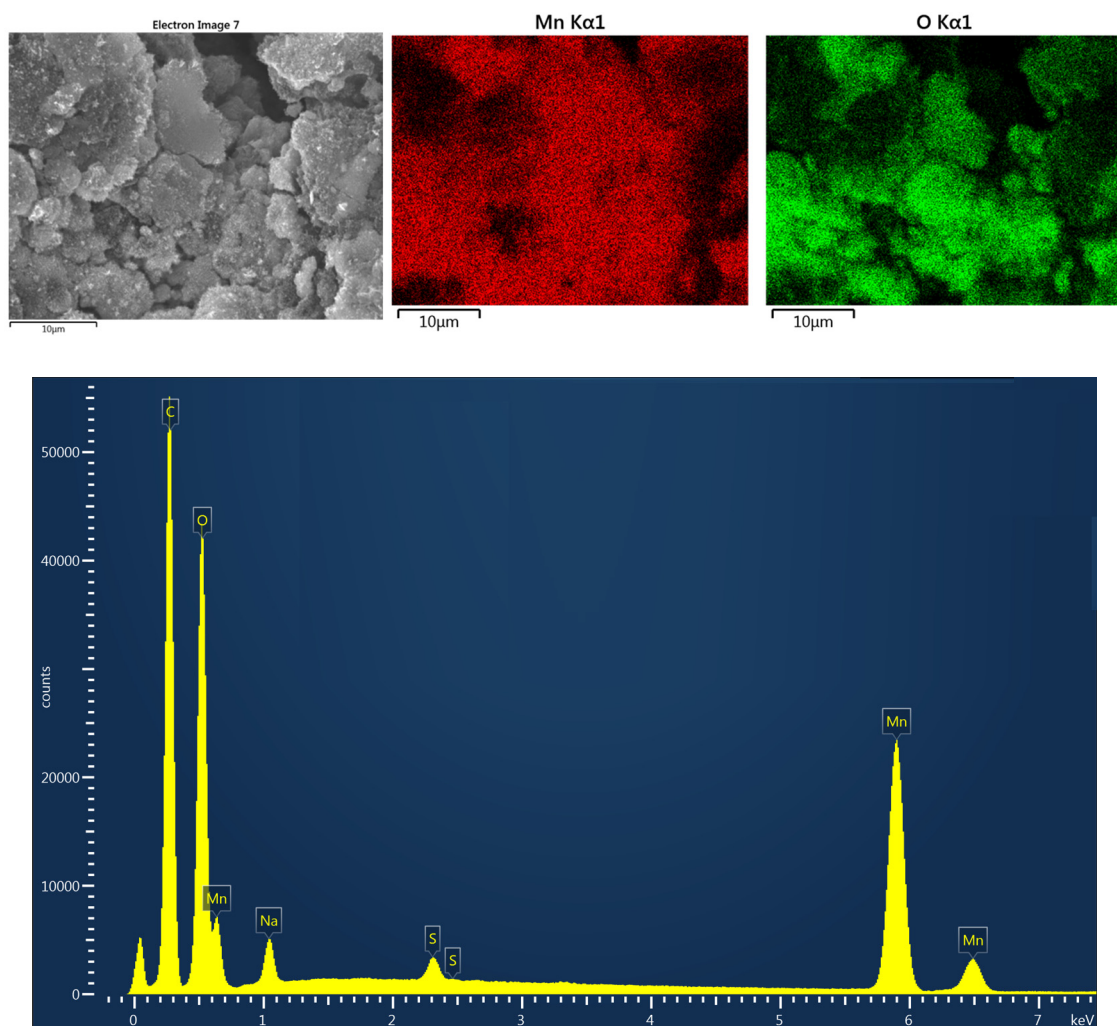
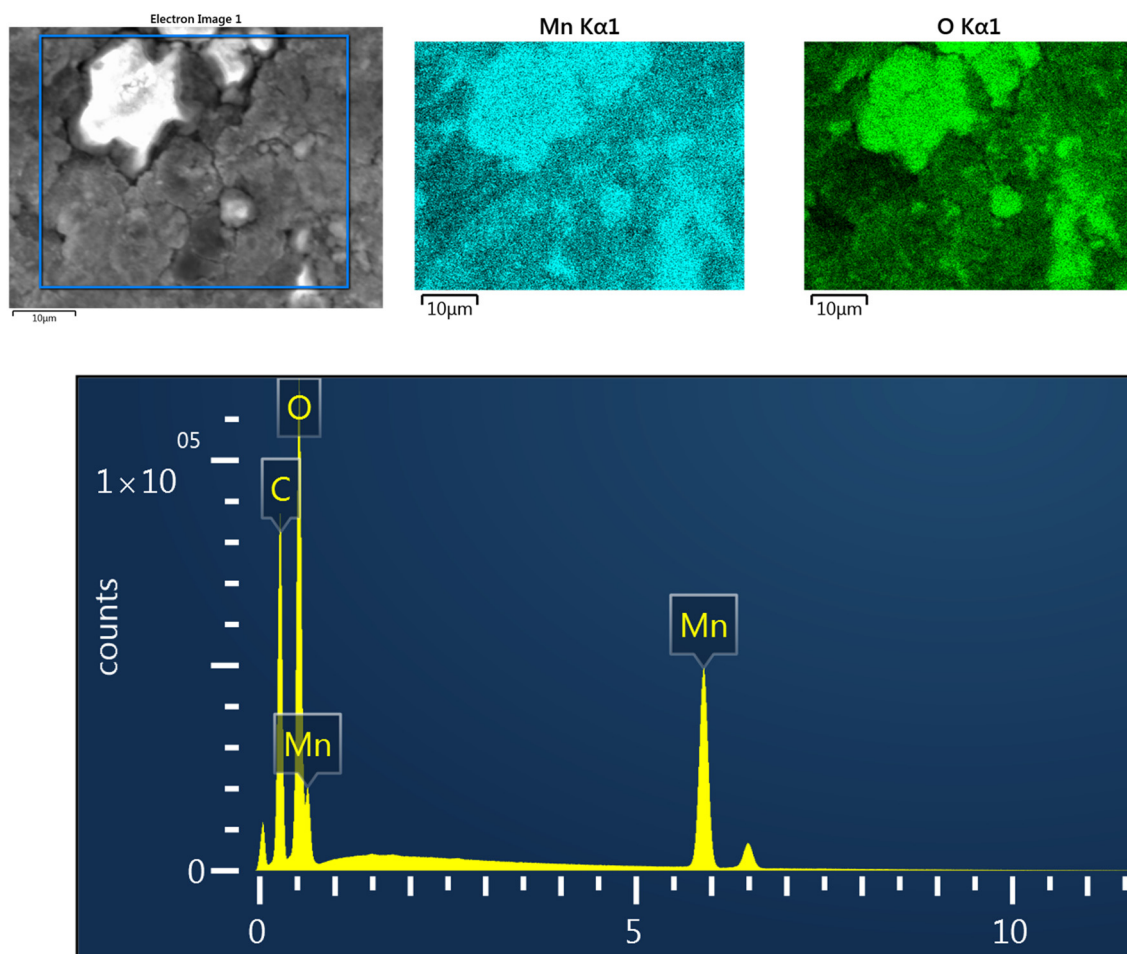


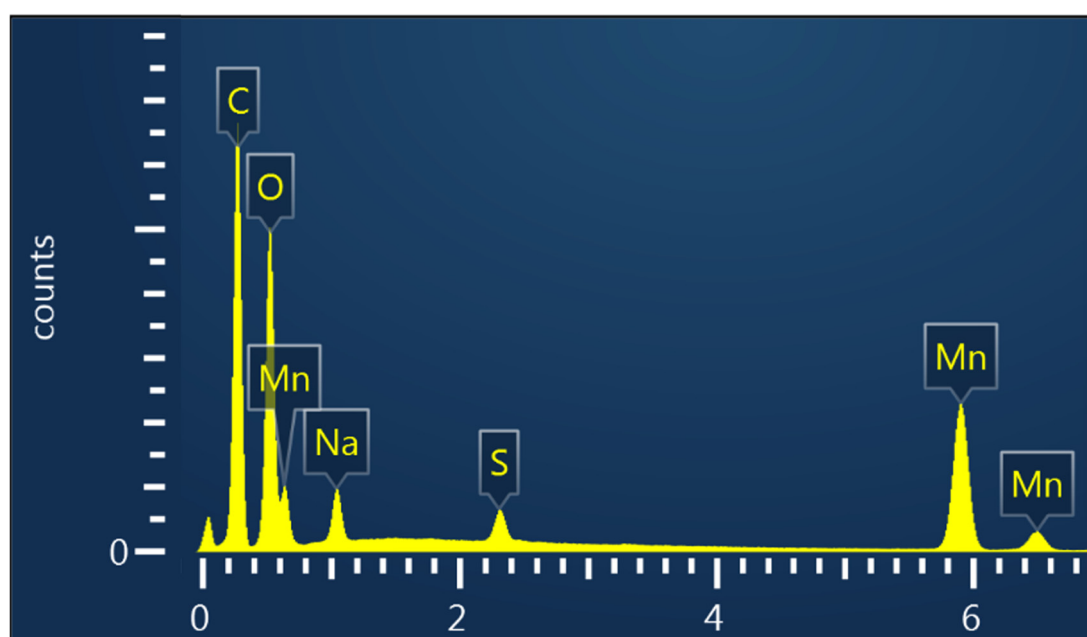
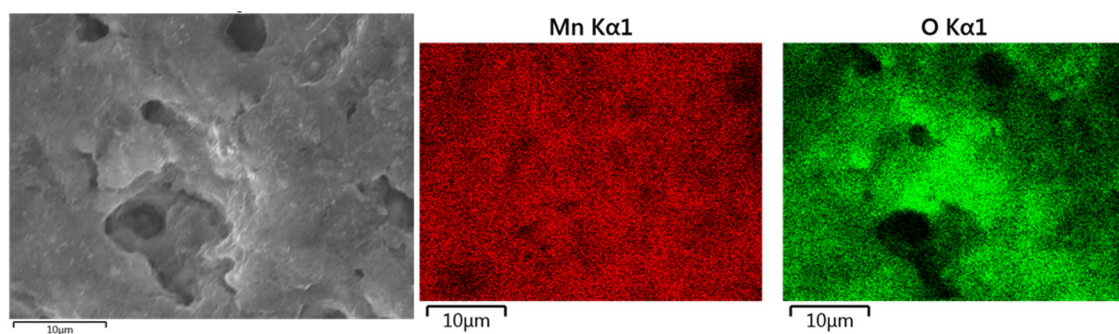
**Figure S1.** EDX data for Mn-PEI electrodes before electrochemical testing.



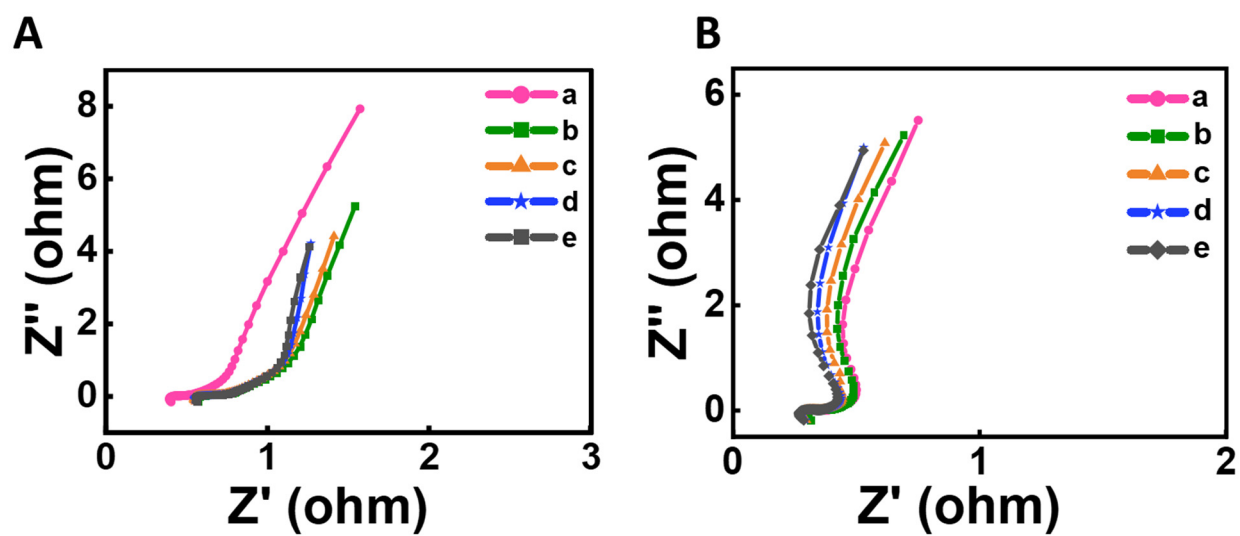
**Figure S2.** EDX data for Mn-PEI electrodes after electrochemical testing.



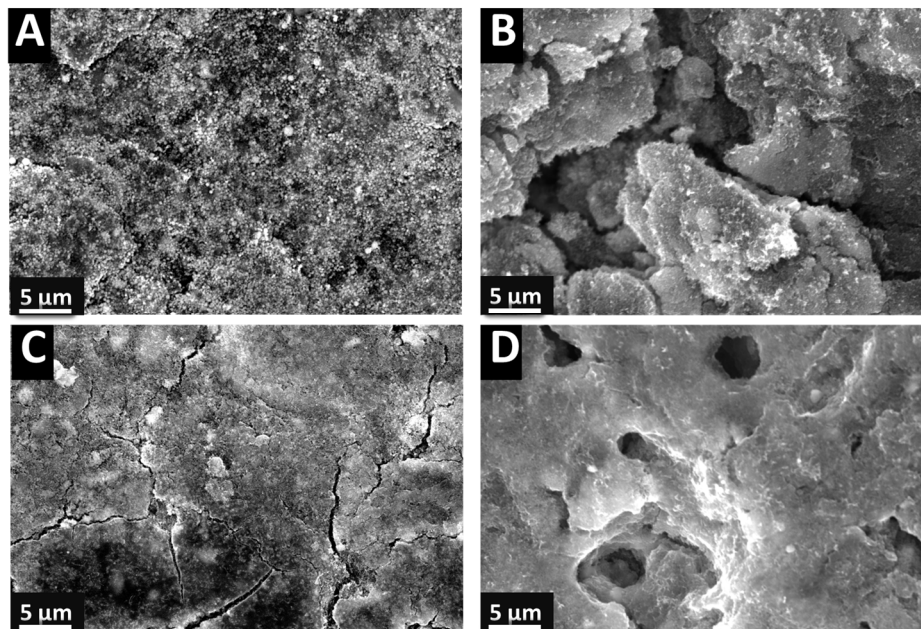
**Figure S3.** EDX data for Mn-MG electrodes before electrochemical testing.



**Figure S4.** EDX data for Mn-MG electrodes after electrochemical testing.



**Figure S5.** (A,B) magnified Nyquist plots for (A) Mn-PEI and (B) Mn-MG respectively after (a) CP1, (b) CP2, (c) CP3, (d) CP4, (e) CP5.



**Figure S6.** SEM images of microstructure for (A,B) fresh and tested Mn-PEI electrode, respectively and (C,D) fresh and tested Mn-MG electrode, respectively.