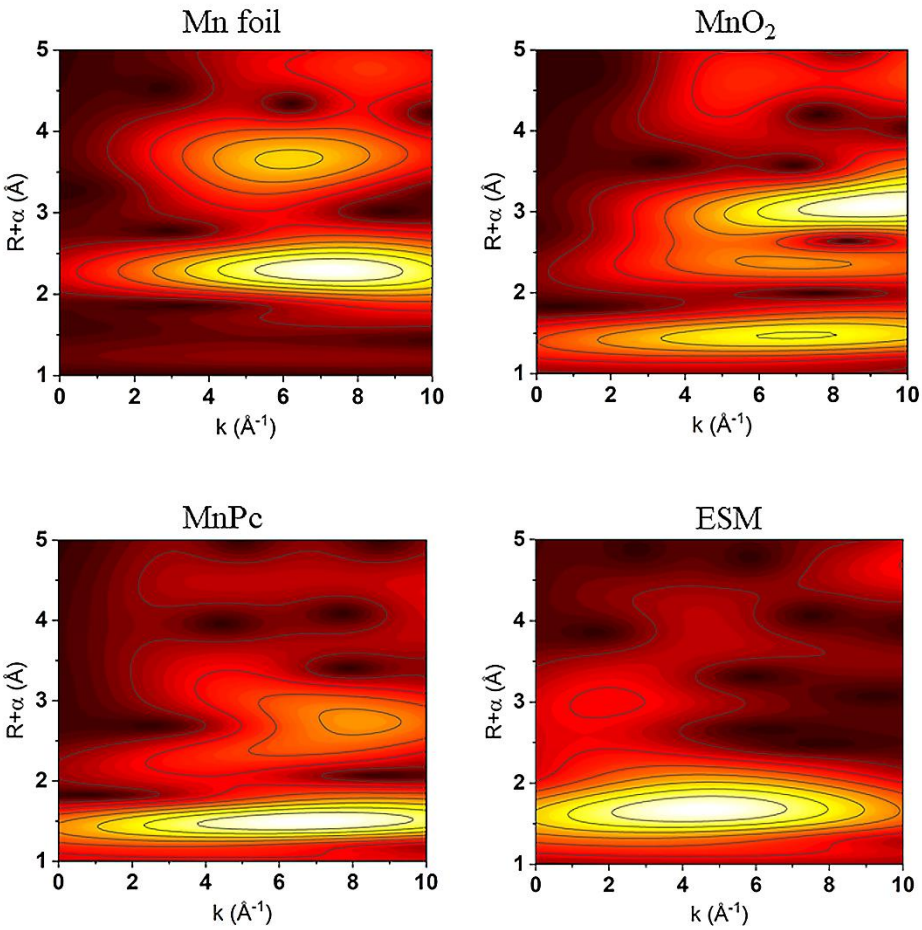


**Fig. S2. Contour maps of Mn foil, $MnO_2$, MnPc, and ESM.** The contour map of Mn foil indicates that the backscattering of metal Mn-Mn coordination is responsible for the maximum intensity at 7.19 $Å^{-1}$. Two distinct maximum intensities were observed at 7.02 and 9.37 $Å^{-1}$ in the $MnO_2$ contour map, attributed to the scattering paths of Mn-O and Mn-Mn. A significant maximum intensity was observed at 6.78 $Å^{-1}$ from MnPc. The highest intensity at 7.19 $Å^{-1}$ corresponds to the backscattering of metal Mn-Mn coordination. The wavelet transform results of ESM revealed only one peak with maximal intensity of about 4.7 $Å^{-1}$, which should likely be attributed to the MnOx species as compared to Mn Foil, MnPc, and $MnO_2$.

ESM, esculetin-manganese complex.