



**Figure S11.** X-ray diffraction patterns of fungal Mn oxides compared with Ni-sorbed  $\delta$ -MnO<sub>2</sub> (Grangeon et al. 2008). NidBi2-7 and NidBi177-7 contain respectively 0.1 and 0.2 “heavy” interlayer cations (Ni and Mn) at TC position. Solid arrows point out the intensity minimum appearing at  $\sim 47^{\circ} 2\theta$  when the amount of interlayer Me cations at TC position increases from 0.1 to 0.2 per layer octahedron. When this number exceeds 0.2, a shoulder appears at  $\sim 42^{\circ} 2\theta$  (dashed arrow).