

# Effects of Biodegradation on Electronic Properties of Common Lithium Manganese Oxides

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The looming era of electric cars and increased production of lithium-ion batteries opens up new questions about long term usage, disposal and chemical stability of materials used for their production.  $\text{LiMn}_2\text{O}_4$  and  $\text{L}_2\text{MnO}_3$  are one of the most common compounds used for cathodes in batteries sold on the consumer market. This work focuses on structural and electronic changes induced in both materials after 3-months degradation in an open air environment in an abiotic (sand) and biotic (compost) environment. The starting materials were structurally characterized using x-ray (XRD) and neutron (NPD) powder diffraction and found to crystallize in the nominal  $Fd-3m$  and  $C2/m$  space groups, respectively. The chemical composition was verified using x-ray photoelectron spectroscopy (XPS) and neutron prompt gamma activation analysis. The effects of degradation were studied by reinvestigating the samples using XRD and XPS, where the main expected effect was a possible leaching out of lithium. The studies did not reveal any statistically significant degradation of the materials both in their structure and composition. At the end a local structure was studied using x-ray absorption on the Mn K edge XANES and the results will be presented at the conference.