Structure, microstructure and ionic conductivity of the solid solution LiTi {sub 2-x} Sn {sub x}(PO {sub 4}){sub 3}

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Description
The Nasicon compounds with the composition LiTi {sub 2-x} Sn {sub x}(PO {sub 4}){sub 3}(x= 0-1.8) were synthesised by the solid state reaction. Their structures were determined from X-ray powder diffraction using Rietveld analysis. All the compositions present the space group R-3c. The refinements show that the Ti and Sn cations are statistically distributed over the same position while the Li ones are exclusively located on the M1 site. The lattice constants a and c exhibit linear variation over the whole composition range. The bond lengths are in accordance with those of other Nasicon structures. The SEM micrographs of the samples show relative porous microstructures. The ionic conductivity is about 10 {sup-4}-10 {sup-5} S cm {sup-1}; for the activation energy, a typical value of 0.32 eV is obtained for x= 0.6 composition whereas significant deviation from linearity in the temperature dependence of the dc conductivity, is observed for the Sn-rich ones. This tendency is discussed along with the structural features.