

done to introduce carriers, holes or electrons, into these layers by chemical substitutions on the cations sites [6-7]. Some authors claimed the presence of superconductivity around 20 K, however this result was not clearly confirmed by other works. We report here on the synthesis of the compounds $(\text{Ba,Sr})_{2-x}\text{K}_x\text{Cu}_3\text{O}_4\text{Cl}_2$ and $(\text{Ba,Sr})_2\text{Cu}_{3-y}\text{O}_4\text{Cl}_2$ in air and under oxygen flux, where the hole doping is respectively achieved by chemical substitution and copper site deficiency. Their structures are resolved by powder x-ray diffraction using the Rietveld method. The variations of the unit-cell parameters and the inter-atomic distances versus x and y are discussed according to the formal charge distributions in the structure [8]. Moreover, the averaged ionic sizes are also invoked to interpret the stability range of such phases.

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Structure and Microstructure of the Solid Solution $\text{LiTi}_{2-x}\text{Sn}_x(\text{PO}_4)_3$ and the Origin of Unusual Evolutions of the Unit-cell Constants of the Nasicon Structures. Nedjemeddine Bounar^a, Abderrahim Benabbas^a. ^a*L.I.M.E Laboratory. University Of Jijel. B.P. 98 Ouled-Aissa 18000 Jijel. Algeria.*

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Nasicon [1] compound have been extensively investigated owing to their interesting physical properties with potential applications as fast ion conductors and low thermal expansions ceramics [2-4]. The Nasicon structure is built up of corner-sharing BO_6 octahedra and PO_4 tetrahedra leading to a frame-work of $\text{B}_2\text{P}_3\text{O}_{12}$ formulas with interconnected channels where cations can be inserted in two types of sites usually noted M_1 at (0,0,0) and M_2 at (2/3,0,1/4) The great flexibility of this structure allows large chemical substitutions and makes it possible that the sites M_1 and M_2 may be empty as in $\text{Nb}_2(\text{PO}_4)_3$, partially occupied or completely full as in $\text{Na}_4\text{Zr}_2(\text{SiO}_4)_3$. The ionic transport in these compounds is due to the migration of the cations through the cavities in the interconnected channels where an order-disorder phenomenon is possible in the partially filled cases. On the other hand, the thermal behaviour is related to the variation of lattice parameters vs. temperature generally variable in opposite senses. Thus, the detailed structural characterisation particularly of the atomic positions and the bond lengths is essential to understand the underlying mechanisms and to optimise such properties.

Our study deals with the structural and micro-structural characterisations of the solid solution $\text{LiTi}_{2-x}\text{Sn}_x(\text{PO}_4)_3$ using the powder X-ray diffraction and the Rietveld refinements. A comparative study is made with the Na-analog phases [5-6] and a global approach is proposed to explain the structural features of the Nasicon phases, that is, the origin of unusual evolutions of the unit-cell constants.

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Structural Resolution of One Lanthanide Phosphonate Family, Combining Monocrystal and Powder Diffraction Data. Eva Fernández-Zapico^a, Jose Montejo^a, Laura Roces^a, Santiago García-Granda^a, Sergei A. Khainakov^b, José R. García^b, Feng-Yi Liu^c, João Rocha^c. ^a*Departments of Physical and Analytical Chemistry.* ^b*Organic and Inorganic Chemistry, University of Oviedo, Spain.* ^c*Chemistry, CICECO, University of Aveiro, Portugal.*

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Metal phosphonate chemistry is of great interest in material science due to their potential applications in many fields such as ion-exchange, catalysis, and sensor devices. Often, metal phosphonates exhibit polymeric structures consisting of chains, layers, or three-dimensional networks, but monomeric structures are also known. In particular, the tunable organic units in diphosphonate $[\text{R}(\text{PO}_3)_2]$ allow the construction of metal phosphonate materials with new architectures. We have recently reported the crystal structure of $[\text{H}_3\text{N}(\text{CH}_2)_4\text{NH}_3]\text{La}[\text{hedpH}][\text{hedpH}_2]$. The crystal structure of this compound, which crystallize in space group P-1, is built up from one-dimensional covalent lanthanum phosphonate cross-linked chains and $[\text{NH}_3(\text{CH}_2)_4\text{NH}_3]^+$ cations [1,2]. Following with the work previously developed [3] we presented here single crystal data of new members of this family, and new structures solved by combination of the known single crystal data and the powder data of the new structures. The powder data were measured in ESRF Synchrotron (Spline). It has been carried out a Rietveld refinement using FullProf with the heavy atoms being the geometry of the remaining H-atoms completed using Mercury. The final structural results show the isostructurality of all compounds, the differences on the intra and intermolecular network will be presented and discussed.

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