

## SYNTHESIS AND PROPERTIES OF NOVEL LANTHANIDE CARBOXYPHOSPHONATES

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**Abstract:** Metal phosphonates are essentially acidic solids featured by groups such as P-OH, -COOH, etc. The presence of bound and lattice water favors the formation of H-bond networks, which make these compounds appropriate as proton conductors, attractive for proton exchange membranes (PEMs) of Fuel Cells.<sup>1</sup> Moreover, these properties can be enhanced by appropriate modification of the synthesis conditions.<sup>2</sup>

We report here, general characteristics of three new series of isostructural compounds resulting from the combination of the polyfunctional 5-(dihydroxyphosphoryl) isophthalate acid with lanthanide ions. All compounds were synthesized under hydrothermal conditions and their crystal structures were solved from powder X-ray diffraction data using synchrotron radiation. In contrast with Series III compounds, which exhibit a layered structure, Series I and II present pillared frameworks. All these compounds contain water molecules that contribute to the formation of H-bond networks. Upon exposure to ammonia vapour, from an aqueous solution, solid state transformations are observed which are accompanied of an enhancement of their proton conductivity properties.

**Key words:** metal phosphonates, coordination polymer, proton-conductivity.

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