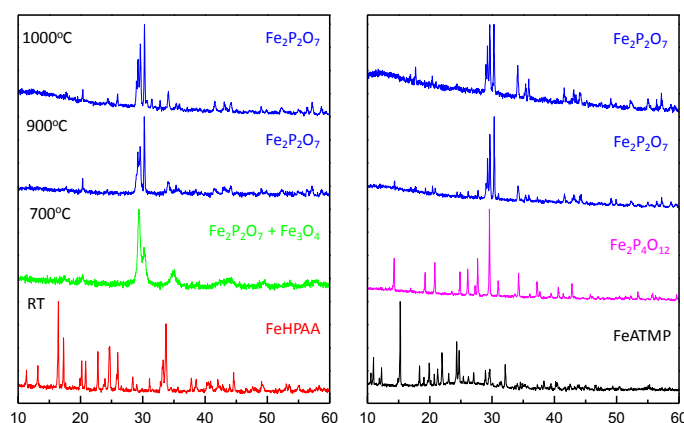


SYNTHESIS AND CHARACTERIZATION OF M(II) PHOSPHONATES (M = Fe, Co, Zn, Mn) AS PRECURSORS FOR PEMFCs ELECTROCATALYSTS

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Metal phosphonates are promising precursors for applications such as proton conductivity [1] and catalysis [2]. Specifically, upon calcination metal polyphosphates are generated that can be used as non-noble metal alternatives [3] to the highly expensive commercial catalysts (Pt) for proton exchange membrane fuel cells (PEMFCs). In this work, we present the synthesis and characterization of metal polyphosphates obtained from transition divalent metal phosphonates (M= Fe, Mn, Co and Zn) both as monometallic and bimetallic systems (solid solutions). For the preparation of the metal phosphonate precursors, two types of organic linkers were selected, i.e. 2-R,S-hydroxiphosphonoacetic acid [$\text{HO}_3\text{PCH}(\text{OH})\text{COOH}$, HPAAs] and nitrilotrismethylenephosphonic acid [$\text{N}(\text{CH}_2\text{PO}_3\text{H}_2)_3$, ATMP]. The as synthesized compounds were calcined between 700 and 1000 °C under N_2 . Depending on the metal/phosphorous molar ratio in the precursor phases, different compositions were found, the corresponding metal pyrophosphate being the major component according to the crystallographic data. Interestingly, in most of cases the solid solutions were preserved in the final product, for instance Fe-Mn, Fe-Co and Fe-Zn. All calcined materials have been also characterized by XPS, SEM/EDS, FTIR-Raman.



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