

Poster Sessions

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Organic-inorganic hybrids constitute an important class of compounds in the exploratory research area of advanced materials design. In this connection, metal phosphonates represent a particularly versatile field for investigation because of the great latitude open to the investigator. During the past two decades a lot of research attention has been devoted to the chemistry of metal phosphonates for their potential applications in ion exchange, catalysis, and in sensor devices [1-5]. The wide choice of metals and the variety of organic ligands, and since that almost any desired organic compound may be converted into a phosphonic acid by known reactions, it is thus possible to introduce phosphonate ligands with different functional groups into the hybrid structures, which suggests the possibility of rational design of structures for highly specific function, and even with unusual properties. Recently, investigations of di-, tri-, and tetra-valent metal phosphonates have yielded exciting structural diversity with interesting chemistries and applications, including porous pillared layered structures [6, 7]. However, reports on the structure and photoluminescence properties of lanthanide (Ln) arylphosphonates or aryldiphosphonates are scarce [8, 9].

Herien, we present a series of novel organic-inorganic hybrids based on trivalent lanthanide (Ln = La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho) and 1,4-phenylbis(phosphonate) formulated as $\text{Ln}[\text{O}_3\text{P}(\text{C}_6\text{H}_4)\text{PO}_3\text{H}]$ and obtained as single phases under hydrothermal conditions either by oven or microwave heat. In the praseodymium compound (Za1) single crystals have been obtained and the crystal structure determined. Za1 crystallize in monoclinic space group, C2/c, with $a = 5.6060(4) \text{ \AA}$, $b = 20.251(7) \text{ \AA}$, $c = 8.2740(6) \text{ \AA}$, $\beta = 108.52(1)^\circ$. All other compounds are isostructural to Za1 as confirmed by Rietveld refinement by using X-ray powder diffraction data. Compounds are characterized by thermal analyses (TG-MS and SDTA), elemental analysis, IR spectra, and X-ray thermodiffraction analysis. These series of compounds exhibit an unusual very high thermal stability. Eu- and Tb-based compounds exhibit, respectively, strong red and green emissions.

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Novel 3D Fluorinated-MOFs: Structure, topology and magnetic properties

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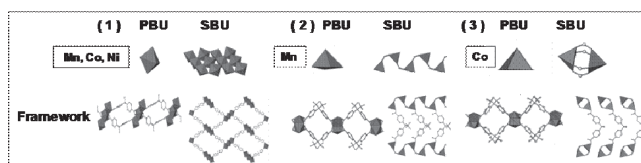
The metal-organic frameworks (MOFs) are a class of materials that are constantly attracting significant attention not only for their potential applications as functional crystalline materials, but also for their fascinating topologies and structural diversity [1]. The use of flexible and extended ligands contributes to the development of porous frameworks with diverse structural topologies, which, in turn, can lead to obtain varied properties even for the same constitutive units. On the other hand, the magnetic behavior of MOFs, which extended inorganic networks or local paramagnetic centers are linked by diamagnetic linkers that can efficiently mediate magnetic exchange, have evoked considerable interest [2]. However, in MOFs, the magnetism may be introduced through the incorporation of magnetic moment carriers such as paramagnetic metals, or open-shell organic ligands, or both [3].

In this way, we decided to proceed our studies obtaining Fluorinated Metal Organic Frameworks (F-MOFs) constructed of the flexible 4,4'-(hexafluoroisopropylidene)bis(benzoic acid) (H_2hfipbb) as ligand and transition metal ions {Mn(II), Co(II) and Ni(II)}, in order to induce interesting magnetic properties. Besides, we have explored several synthesis conditions to expand the possibilities to get diverse crystal topologies expecting different magnetic properties.

Three novel compounds (1a-c) with formula $[\text{M}_3(\text{hfipbb})_2(\text{OH})_2(\text{H}_2\text{O})]$, M = Mn, Co, Ni has been hydrothermally synthesized and completely characterized. The compound 1a's structure corresponding to the P2₁/c space group, has been determined by single crystal synchrotron XRD at the ESRF- BM16 beam line, while for compounds 1b and 1c powder diffraction methods were applied in order to obtain both cell parameters and the space groups. Such study indicated the isostructural character of compounds 1a-c. Besides, another two compounds with formula $[\text{M}_2(\text{hfipbb})_2(\text{H}_2\text{hfipbb})]$, M = Mn (2) and Co (3), were hydrothermally obtained at different synthesis conditions and their structures, corresponding to the C2/c and P2₁/n space groups, respectively, were determined by conventional single crystal XRD data.

Magnetic behavior of compounds 1a-c and 3 has been studied and such results indicate that compounds 1a and 3 have antiferromagnetic interactions while 1b and 1c are ferromagnetics.

The topological study of 2 and 3, having the same composition but different crystal structure has also been performed.



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Lanthanide-organic frameworks of Bis-Gd complexes: composed by carbonate ions spacers