**Synthesis of molecular phosphonates of group III elements**

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The general procedur es for preparation of transition metal phosphonates involve hydrothermal synthesis. Common traits shared by hydrothermally prepared metal phosphonates are layered 2D structures and a low solubility in a wide range of solvents. On the other hand, phosphonates produced by a simple salt metathesis in aprotic organic solvents, such as pyridine, can form products with very different molecular cluster geometries. A series of reactions of ScCl3, YCl3 and LaCl3 with *tert*-butyl, phenyl and vinyl phosphonic acids have been performed in dry pyridine. Obtained products have been studied by 31P NMR spectroscopy and by single-crystal XRD analysis. Three products have been isolated and structurally characterized using SCXRD. From the the reactions of *tert*-butyl phosphonic acid with yttrium(III) and La(III) it is [μ3-tBuP(O)3]4(YClpy2)2(YCl2pyH)2 in pseudo-cubane geometry with [Hpy]3[YCl6]·2py as a byproduct and La4[μ6-tBuP(O)3]2[μ4-tBuPO2(OH)]2(μ2-Cl)2Cl8(Hpy)6 with bridged-square geometry. Moreover, such molecular products still exhibit reasonable solubility in organic solvents, such as pyridine and DMSO.