

Synthesis of Rare-Earth Pyrazolate Compounds

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Abstract : Since coordination behavior of pyrazoles and pyrazolate ions are widely versatile towards a great range of metals such as d-block, f-block as well as main group elements; they attract interest as ligands for preparing compounds. A variety of rare-earth pyrazolate complexes have been synthesized by redox transmetalation/protolysis (RTP) previously, therefore, a variety of rare-earth pyrazolate complexes using two pyrazoles, 3,5-dimethylpyrazole (Me₂pzH) and 3,5-di-tert-butylpyrazolate (t-Bu₂pzH), in which the structures span the whole La-Lu array beside Sc and Y has been synthesized by RTP reaction. There have been further developments in this study: Synthesizing structure of [Tb(Me₂pz)₃(thf)₂] which is isomorphous with those of the previously reported [Dy(Me₂pz)₃(thf)₂] and [Lu(Me₂pz)₃(thf)₂] analogous that has two μ-1-(N):2-(N')-Me₂pz ligands (the most common pyrazolate ligation for non-rare-earth complexes). Previously most of the reported compounds using t-Bu₂pzH were monomeric compounds however the lanthanum derivative [La(Me₂pz)₃(thf)₂] ,which has been reported previously without crystal structure, has now been structurally characterized, along with cerium and lutetium analogue. Also a polymeric structure with samarium has now been synthesized which the neodymium analogue has been reported previously and comparing these polymeric structures can support the idea that the geometry of Sm(tBu₂pz)₃ affect the coordination of the solvent. Also, by using 1,2-dimethoxyethane (DME) instead of tetrahydrofuran (THF) new [Er(tBu₂pz)₃ (dme)₂] has now been reported.

Keywords : lanthanoid complexes, pyrazolate, redox transmetalation/protolysis, x-ray crystal structures

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