

**P.07.01.14***Acta Cryst.* (2005). A61, C298**From P<sub>4</sub> to PH<sub>3</sub> Metal Complexes by Plane Hydrolysis**

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The large-scale production of PH<sub>3</sub>, a valuable feedstock material for the synthesis of many organophosphorus derivatives, is hampered by difficult operational conditions. This makes conversion routes, possibly catalytic, of elemental phosphorus to phosphine highly desirable.

The monometal [CpRu(PPh<sub>3</sub>)<sub>2</sub>(η<sup>1</sup>-P<sub>4</sub>)]PF<sub>6</sub> (**1**) and the dimetal [{CpRu(PPh<sub>3</sub>)<sub>2</sub>}]<sub>2</sub>(μ,η<sup>1,1</sup>-P<sub>4</sub>)(PF<sub>6</sub>)<sub>2</sub> (**2**) P<sub>4</sub> derivatives, respectively containing a monodentate and bridging P<sub>4</sub> molecule, surprisingly undergo hydrolysis in very mild conditions yielding the PH<sub>3</sub> complex [CpRu(PPh<sub>3</sub>)<sub>2</sub>(PH<sub>3</sub>)]PF<sub>6</sub> (**3**) in stoichiometric amount. Remarkably, this behaviour had not been observed for the Cp\* analog of **1** [1]. The structures of **1-3** have been determined; this should help to rationalise the observed reactivity of **1** and **2**, which appears to disclose new paths of phosphorus chemistry.

[1] de los Rios I., Hamon J.-R., Hamon P., Lapinte C., Toupet L., Romerosa A., Peruzzini M., *Angew. Chem. Int. Ed.*, 2001, **40**, 3910.

**Keywords:** phosphorus compounds, ruthenium compounds, hydrolysis

**P.07.01.15***Acta Cryst.* (2005). A61, C298**New Polymeric Barium(II) 2,2'-diphenyldicarboxylate Complex**

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A multidentate ligand such as 2,2'-diphenyldicarboxylic acid (H<sub>2</sub>dpdc) is a good candidate for the construction of coordination polymers. In the crystal structures of transition metal complexes with H<sub>2</sub>dpdc, the ligand exhibits several kinds of coordination modes [1-3]. Owing to the higher coordination number, the reactions of H<sub>2</sub>dpdc with alkaline-earth metals may generate polymers with different coordination modes. To the best of our knowledge, alkaline-earth 2,2'-diphenyldicarboxylate complexes have never been reported.

A new barium(II) complex [Ba(Hdpdc)<sub>2</sub>(H<sub>2</sub>O)<sub>2</sub>] has been synthesized. It crystallizes in the monoclinic space group P2<sub>1</sub>/n. The barium atoms are nine coordinated and the coordination geometry around them can be best described as a distorted capped square antiprism. The geometry of the two monoanions is similar to those found in the pure acid [4]. The three-dimensional structure is polymeric and consists of infinite chains of face-sharing Ba polyhedra, running parallel to the [010] axis. The Ba..Ba distances across these chains are 4.139(2) Å.

[1] Rueff J. M., Pillet S., Claiser N., Bonaventure G., Souhassou M., Rabu P., *Eur. J. Inorg. Chem.*, 2002, 895. [2] Kumagai H., Inoue K., Kurmoo M., *Bull. Chem. Soc. Jpn.*, 2002, **75**, 1283. [3] Lu J. Y., Schauss V., *Inorg. Chem. Comm.*, 2003, **6**, 1332. [4] Fronczek F. R., Davis S. T., Gehrig L. M. B., Gaudour R. D., *Acta Cryst.*, 1987, **C43**, 1615.

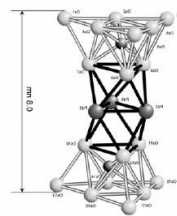
**Keywords:** 2,2'-diphenyldicarboxylic acid, barium complexes, crystal structure

**P.07.01.16***Acta Cryst.* (2005). A61, C298**Fabrications of Carbon Nanotube Coated with Os-Pd Mixed-Metal Nanoparticles**

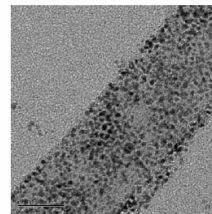
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Metal nanoparticles have aroused considerable attention in the

past few years. Most of the preparations are based on the reduction of metal salt with organic stabilizers or metal vapour deposition from the corresponding metal. Both of the above methods result in particles with a range of sizes. We are interested in preparing metal particles with exact size and shape. We recently established a reliable route to Os-Pd mixed-metal nanoclusters with 21 metal atoms and precise geometry [1]. We also try to prepare larger metal nanoparticles coated on carbon nanotubes using this nanocluster as starting material. The resultant nanoparticles were found to have uniform size and same metal ratio as the nanocluster.



Metal core geometry of



TEM micrograph of metal

[1] Yung K.-F., Wong W.-T., *Angew. Chem. Int. Ed.*, 2003, **5**, 553-555.

**Keywords:** carbon nanotube, metal cluster, osmium

**P.07.01.17***Acta Cryst.* (2005). A61, C298**Synthesis and Structural Characterization of a Series of High-Hydride Content Osmium-Rhodium Carbonyl Complexes**

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Hydrido-transition metal clusters have been known for years, however few are reported in which the ratio hydride : metal exceeds unity. Such high hydrogen content of the clusters is important for the transition metal complexes to serve as hydrogenation catalyst and potential hydrogen storage materials. Hydrogenation of [Os<sub>5</sub>Rh<sub>2</sub>(η<sup>6</sup>-C<sub>6</sub>H<sub>5</sub>CH<sub>3</sub>)(μ-CO)(CO)<sub>16</sub>] with [Os<sub>3</sub>(μ-H)<sub>2</sub>(CO)<sub>10</sub>] in chloroform under reflux resulted in two hydrogen rich compounds [{Os<sub>7</sub>Rh<sub>3</sub>(μ-H)<sub>11</sub>(CO)<sub>23</sub>·CH<sub>2</sub>Cl<sub>2</sub>] **1** and [{Os<sub>5</sub>Rh<sub>3</sub>Cl(μ-H)<sub>8</sub>(CO)<sub>18</sub>}]<sub>2</sub>·CH<sub>2</sub>Cl<sub>2</sub> **2** in moderate yield. While treatment of [Os<sub>5</sub>Rh<sub>2</sub>(η<sup>6</sup>-C<sub>6</sub>H<sub>5</sub>CH<sub>3</sub>)(μ-CO)(CO)<sub>16</sub>] with hydrogen in refluxing chloroform yielded another new cluster compound, [Os<sub>5</sub>Rh(μ-H)<sub>5</sub>(CO)<sub>18</sub>] **3** in 20% yield, together with a known osmium-rhodium cluster, [Os<sub>6</sub>Rh(μ-H)<sub>7</sub>(μ-CO)(CO)<sub>18</sub>] as the major compound. The molecular structures of the three clusters have been established by single crystal X-ray diffraction, carried out on crystals of compounds **1-3** by slow evaporation of *n*-hexane into CH<sub>2</sub>Cl<sub>2</sub>. The metal core of **2** consists of two tetrahedral, Os(1), Os(2), Rh(2), Rh(1) and Os(4), Os(5), Rh(3), Rh(1) units fused together to form a bitetrahedron via the Rh(1) vertex. The bitetrahedron is additionally bonded to another Os(3) by Rh(2) and Rh(3), which form a triangular face with a Cl atom tri-capping the three metal atoms in a μ<sup>3</sup> mode. The corresponding Rh-Cl-Rh and Rh-Cl-Os bond angles fall in the range 70.1(3) to 73.0(3) °, which is comparable to that observed in a Cl face-bridged tritungsten cluster, [W<sub>3</sub>(μ<sub>3</sub>-Cl)(μ-Cl)<sub>3</sub>Cl<sub>9</sub>]<sup>3-</sup>.

**Keywords:** osmium-rhodium clusters, hydride content, single crystal X-ray diffraction

**P.07.01.18***Acta Cryst.* (2005). A61, C298-C299**Scorpionate Complexes with the Main Group Elements Ca, Ba, Sr**

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The poly(pirazolyl)borate ligands together with various substituted forms have developed into one of the most versatile ancillary ligand in metal coordination chemistry. Particular attention is sometimes devoted to special azolyl rings, such as triazolyl, methyl- or trifluoromethyl-pyrazolyl rings. These ligands can exert quite