ZrCuSiAs-type Phosphide Oxides: TbRuPO, DyRuPO, the Series LnOsPO (Ln = La, Ce, Pr, Nd, Sm), and ThAgPO

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The title compounds were prepared by solid-state reactions and via tin and NaCl/KCl fluxes. They crystallize with the tetragonal ZrCuSiAs-type structure (P4/nmm, Z = 2), which was refined from single-crystal X-ray data of PrOsPO (a = 402.1(1), c = 824.0(1) pm, wR2 = 0.0490, 365 F2) and ThAgPO (a = 396.1(1), c = 877.8(1) pm, wR2 = 0.0307, 314 F2). They belong to a large family of isotypic compounds, of which several, mainly fluorine doped, iron containing compounds LnFeAsO1−xFx were discovered to be superconducting with relatively high transition temperatures only recently in other laboratories. Chemical bonding in these compounds is briefly discussed, and the importance of the weakly bonding Fe–Fe interactions for the phase transitions and the superconductivity is emphasized from the viewpoint of structural chemistry. A brief account of the history of the preparation of these compounds in our laboratory is given. Originally many of these compounds were obtained only in small amounts as byproducts in the course of the preparation of ternaries.

Key words: Rare Earth Compounds, Phosphides, Oxides, ZrCuSiAs-type Compounds