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Chemical Physics and Properties of $ThPt_2$ ANDREAS LEITHE-JASPER, MPI-CPfS Dresden, ROMAN GUMENIUK, MPI-CPfS Dresden and TU Bergakademie Freiberg, WALTER SCHNELLE, MICHAEL NICKLAS, YURI GRIN, MPI-CPfS Dresden — $ThPt_2$ crystallizes with a unique type of structure (space group $I4/mmm$, $a = 4.1569(2)$ Å, $c = 14.3678(6)$ Å, which belongs to the group of the close-packed tetragonal structures (Pearson symbol $tI12$). An analysis of the chemical bonding by the electron density/electron localizability approach reveals formation of two-dimensional platinum anions separated by the Th cations. Measurements of magnetic susceptibility, electrical resistivity and specific heat show $ThPt_2$ to be diamagnetic with good metallic conductivity ($rho(300\,K) \approx 8.5\mu\Omega\,\mathrm{cm}$). The properties are in good agreement with the calculated electronic structure with a low DOS ($N(E_F) = 0.92$ states eV^{-1} $\mathrm{f.u}^{-1}$). The stability of the compound with respect to other possible structural modifications was studied theoretically.

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