

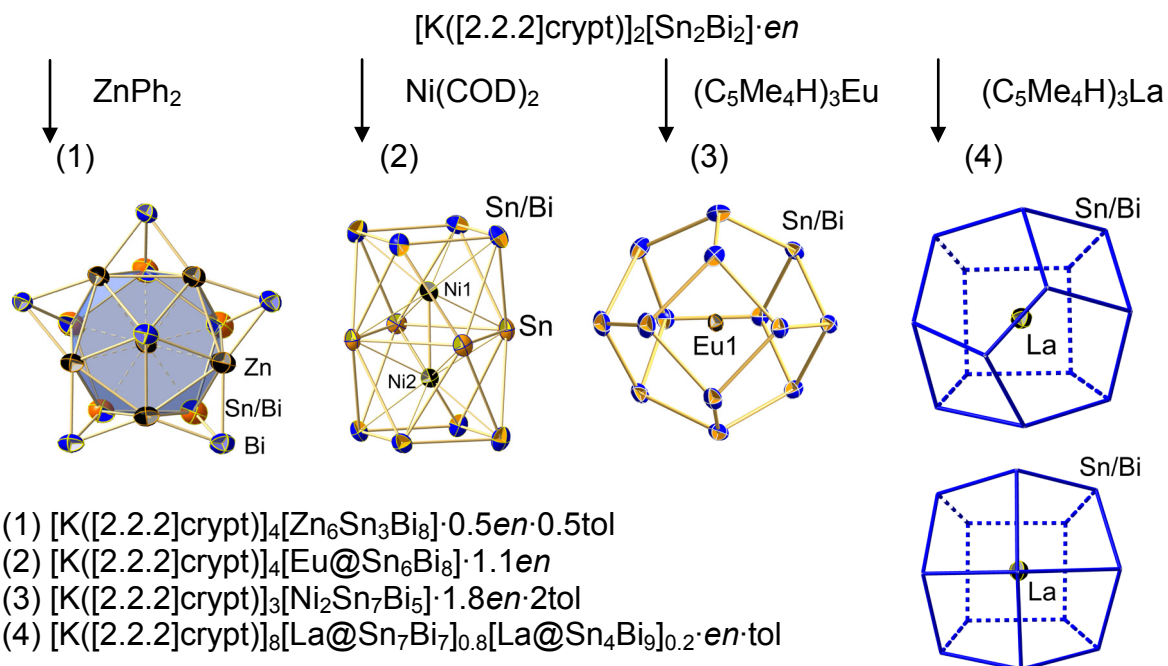
Ternary Intermetalloid Cluster: Syntheses, Characterisation & Quantum Chemical Investigation

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Intermetalloid clusters synthesized by reactions of well known Zintl anions $[T_9]^{4-}$ ($T=Si-Pb$) or $[E_7]^{3-}$ ($E=P-Sb$) and neutral transition metal compounds $[M(L)_n]$ in ethylenediamine (*en*) or dimethylformamide (dmf) have been investigated for several years [1] since they serve as models for doped metals and might be useful precursors for nanostructured intermetallic phases [2]. Furthermore, their bonding situation and formation processes in solution represent interesting research objects. Herein, a binary tetrahedral anion of group 14 and group 15, $[Sn_2Bi_2]^{2-}$, was chosen as a reactant for the preparation of ternary intermetalloid Zintl anions in a bottom-up strategy by reactions with transition metal or lanthanide compounds, in order to explore the unknown field of M/14/15 compounds and to contribute to the development of a general rule to explain the formation and bonding situation of intermetalloid clusters.

Reactions of $[K([2.2.2]crypt)]_2[Sn_2Bi_2] \cdot en$ [3] with $Zn(Ph)_2$ [4], $Ni(COD)_2$ [5], $(C_5Me_4H)_3Eu$ [6] or $(C_5Me_4H)_3La$ [7] in *en* (toluene) have been performed and the resulting crystalline compounds were analyzed by X-ray diffraction, electron spray ionization mass spectrometry and quantum chemical investigations using density functional theory methods within the program system Turbomole.



References:

- [1] a) S.C. Sevov, J.M. Goicoechea, *Organometallics* **2006**, *25*, 5678–5692; b) T.F. Fässler, *Angew. Chem. Int. Ed.* **2001**, *40*, 4161–4165. [2] N. Korber, *Angew. Chem. Int. Ed.* **2009**, *48*, 3216–3217. [3] S.C. Critchlow, J.D. Corbett, *Inorg. Chem.* **1982**, *21*, 3286–3290. [4] F. Lips, S. Dehnen, *Angew. Chem. Int. Ed.* **2009**, *48*, 6435–6438. [5] F. Lips, S. Dehnen, *submitted*. [6] F. Lips, R. Clérac, S. Dehnen, *submitted*. [7] F. Lips, R. Clérac, U. Linne, J. Bamberger, S. Dehnen, *in preparation*.