Structural Diversity of Telluridoindates

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Chalcogenidoindate cluster networks, prepared for example by solvothermal reaction from the elements or simple, binary compounds, show great promise as a new class of materials [1]. They combine the porous network characteristics of zeolites with the optoelectronic properties of semiconducting chalcogenides to give rise to new applications, such as photocatalysis, ion conduction and photoluminescence [2].
Yet while the chemistry of the indium selenides and especially the indium sulfides has been in the focus of researchers in recent years, much less is known about the indium tellurides beyond their classic solid state compounds. Thus it has been our goal to synthesize new molecular and extended anionic compounds of this class and explore their specific features with regard to the characteristics of the underlaying telluride phases, such as small band gaps and, possibly, thermoelectric properties.

Two different extraction approaches were chosen to generate either soluble, molecular telluridoindates that enable further derivatization towards multinary clusters, or extended telluridoindates.

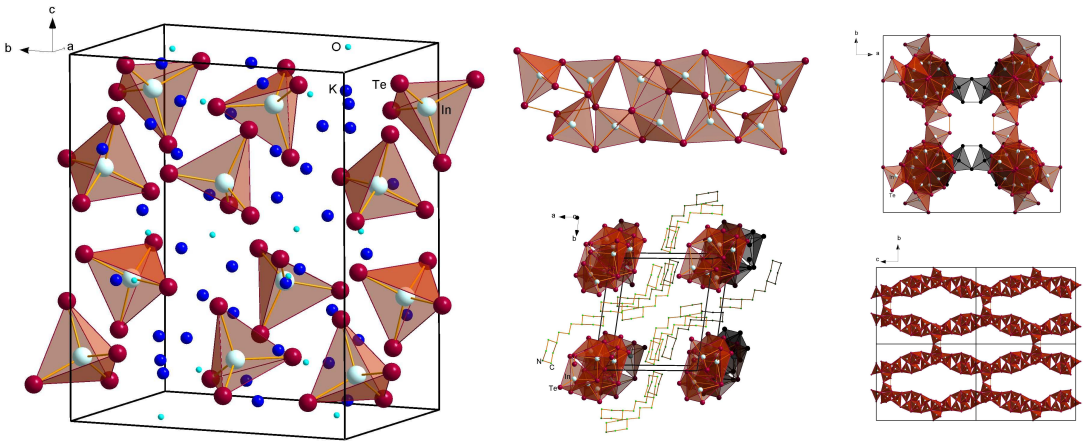

Fig. **1**: From a simple building block to a complex network: $[K_5(H_2O)_2][InTe_4]$, $[H_2TMP]_2[In_8Te_{16}]$ and $[H_2HMDA]_4[In_{12}Te_{23}]$ (TMP = 4,4'-Trimethylenepiperidine , HMDA = 1,6-Diaminohexane)

References:

[1] P. Feng, X. Bu, N. Zheng, *Acc. Chem. Res.* **2005**, *38*, 293-303.
[2] a) N. Zheng, X. Bu, H. Vu, P. Feng, *Angew. Chem., Int. Ed.* **2005**, *44*, 5299-5303. b) N. Zheng, X. Bu, P. Feng, *Nature* **2003**, *426*, 428-432. c) N. Zheng, X. Bu, B. Wang, P. Feng, *Science* **2002**, *298*, 2366-2369.