MS15-P9 A new structural type in alkaline rare-earth sulfides $MRES_2$ and $TlRES_2$

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Some of the rhombohedral structures of the title compounds (see Fig. 1) are promising class of luminofors (*e.g.* Havlák *et al.*, 2011). The present analysis was undertaken in order to improve crystal data which are necessary for crystal engineering. Single-crystal X-ray analysis of $NaNdS_2$, $NaSmS_2$ and $NaEuS_2$ revealed a new structural type among Na rare-earth sulfides. This structural type has already been described for $NaPrTe_2$ (*Fd-3m;* Lissner & Schleid, 2003). However, the symmetry of $NaNdS_2$, $NaSmS_2$ and $NaEuS_2$ may be slightly distorted from the symmetry of *Fdm* as it is indicated by the Rietveld refinement. This structural type can be considered as a transitory state between the cubic phase which corresponds to NaCl with disordered cations and the rhomboderal one of - $NaFeO_2$ structural type – see Fig. 1. The structures of NaCl type show diffuse scattering which is most intense in $NaLaS_2$ and which corresponds to that observed by Guymont *et al.* (1990) in $Li_{1-x}Eu^{2+}_{2x}Eu^{3+}_{1-x}S_2$. Moreover, another new structural type has been discovered for $NaTbS_2$. For other structures of $MRES_2$ see Fábry *et al.*, 2014*a*,*b* and Havlák *et al.*, 2015 (RE means a rare-earth element).

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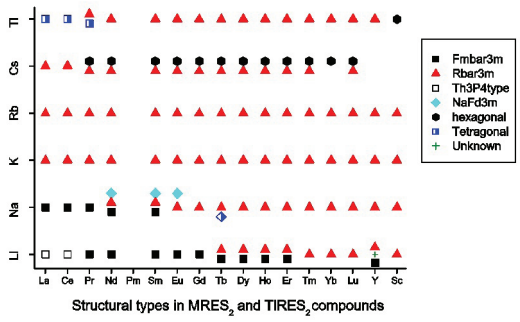

Figure 1. The overview of known structural types in $MRES_2$ and $TlReS_2$.

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