Untersuchungen zum chemischen Transport von YX_3 mit AlX_3 und zur Existenz von gasförmigen und festen Komplexen YAl_3X_{12} (X = Br, I)

Investigations on the Chemical Transport Reaction of YX_3 with AlX_3 and on the Existence of Gaseous and Solid Complexes YAl_3X_{12} (X = Br, I)

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Chemical Transport Reaction, Yttrium Aluminium Halides, Enthalpy of Formation, Standard Entropy, Total Pressure Measurements

The dominant gaseous complexes YAl_3Br_{12} and YAl_3I_{12} were generated in the chemical transport reactions of YBr_3 with $AlBr_3$ and YI_3 with AlI_3. The enthalpy of formation

$$\Delta H_B^0(YAl_3Br_{12,g,298}) = -484{,}5 \pm 6 \text{ kcal/mol}$$

and the standard entropy

$$S^\circ(YAl_3B_{12,g,298}) = 290{,}0 \pm 7{,}5 \text{ cal/K·mol}$$

have been calculated. It follows from total pressure measurements of mixtures of $YBr_{3,s}$ with $AlBr_{3,l}$ and $YI_{3,s}$ with $AlI_{3,l}$, respectively, that complexes $YAl_3Br_{12,s}$ and $YAl_3I_{12,s}$ do not exist up to the boiling points of the aluminium trihalides.

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