# Synthesis and thermal stability of lanthanum chloride and sulfate lowest hydrates

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Different methods are used for drying air, other gases and organic liquids. Certain advantages give the methods based on the use of chemical water absorbents, especially anhydrous salts, such as chlorides and sulfates often having high hygroscopic properties. It was shown [1] that the drying power of these salts depends on their lowest hydrates thermal stability; thus the temperature dependence of these hydrates water pressure is necessary to describe the desiccant properties of anhydrous salts.

The aim of this work was to obtain this information for lanthanum chloride and sulfate lowest hydrates. A derivatographic method with a special vessel having a thin capillary was used to determine the decomposition temperature of the lowest hydrates at the atmospheric pressure. Then the temperature dependence of water vapor was derived [2] by use of the approximate decomposition entropy (146,8 ± 4 J/mol·K [3]). This functional dependence (Fig.) is not very precise, but it is sufficient for the evaluation of drying power of the salts concerned.

The highest hydrates of these salts ($LaCl_3 \cdot 7H_2O$ and $La_2(SO_4)_3 \cdot 5H_2O$) were obtained by crystallization from their water solutions. The latter does not liquefy on heating in our conditions, but the chloride melts incongruently at about 90 °C to give a sintered product showing too high decomposition temperatures of trihydrate and monohydrate. Therefore the lower hydrate $LaCl_3 \cdot 3H_2O$ was obtained with a method of controlled isothermal drying at the temperature 80 °C. This intermediate hydrate shows no liquefying on heating and thus the minimal kinetic inhibition of the decomposition process is achieved.

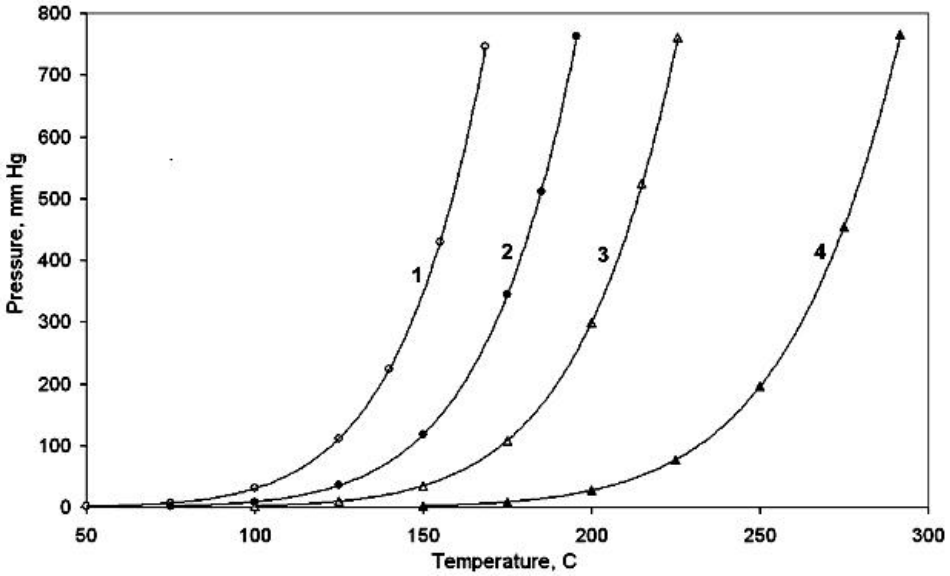


Fig. Water pressure of hydrates:$LaCl_3$ tri- (1) and mono-(2), $La_2(SO_4)_3$ penta- (3) and mono- (4)

**References**

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