

THERMAL EXPANSION OF SOLID  
SF<sub>6</sub>, CHCl<sub>3</sub>, CCl<sub>4</sub>, AND C<sub>6</sub>H<sub>6</sub>

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S u m m a r y

The absolute dilatometric study of thermal expansion is carried out for the high temperature phase of solid SF<sub>6</sub>, CHCl<sub>3</sub>, CCl<sub>4</sub> and C<sub>6</sub>H<sub>6</sub> in the temperature range 85 – 170 K by a laser Michelson interferometric dilatometer. From the comparison of the thermal expansion results for the investigated samples and solid xenon in reduced coordinates, the qualitative analysis was carried out to investigate the influence of the phonon-rotational interaction in molecular crystals with different violations of the spherical symmetry to check the validity of the law of corresponding states. It is found that, for solid SF<sub>6</sub> and CCl<sub>4</sub> in the high-temperature region with increase in temperature due to a growth of libration amplitudes, the weak additional effect takes place in comparison with solidified rare gases. For solid CHCl<sub>3</sub> and C<sub>6</sub>H<sub>6</sub> this effect is more powerful. The Gruneisen's constants and molar rotational heat capacity for solid SF<sub>6</sub> are calculated. It is shown that these constants are the same as for solidified rare gases and weakly raise with temperature in accordance to the Max Born's theory. Rotational capacity for the highest temperatures is described by the model of free spherical rotator. The results received are in good agreement with the existing X-ray diffraction data for SF<sub>6</sub>. The difference between more symmetric SF<sub>6</sub>, CCl<sub>4</sub> and solid CHCl<sub>3</sub>, C<sub>6</sub>H<sub>6</sub> is explained by the beginning of rotational movement in the first case and its absence in the second due to higher rotational potentials.