equilibrate. There are indications for the existence of a mixed phase in this temperature range between 190K and 158K. All the phase changes in this system have been found to have hysteresis.

Single crystal neutron diffraction data have been collected at 190K, 176.5K, 168K and 150K (upto \( \sin \theta / \lambda = 0.50 \alpha - 1 \), \( \lambda = 1.036 \AA \). The kinetics of the phase transitions and the structural details of various phases will be presented.

05. PHYSICAL PROPERTIES AND STRUCTURE

05.1-36 POLYTYPISM AND PHASE TRANSITION OF Sb₂OⅢ₆
2. THE ORDER PARAMETER

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In this paper we report on birefringence measurements performed at the antiferrodistortive phase transitions of all polytypes of Sb₂OⅢ₆ (SOI) identified up to now. Details of the structure, polytypism and notation are given in the accompanying contribution (I.R. Jahn, H. Altenburger and V. Krömer, this conference). The phase transitions ranging between 438 K and 481 K can be described by a zone boundary soft mode. Consequently, the birefringence follows the square of the order parameter.

The most common centrosymmetric basic type 2MC has been studied as a function of temperature and hydrostatic pressure (upto 0.5 GPa). The room temperature phase has Fm3m space group. The low temperature phase, which exists below 78 K has the monoclinic space group C2/m.

The phase transition is weakly of first-order, the order parameter can be well described by the classical Landau formalism with a negative 4th order term. Hydrostatic pressure increases the transition temperature of pure 2MC by 10 K / 0.1 GPa, whereas the discontinuity is practically not affected by pressure. In the mixed system, however, the As content leads to a drastic lowering of \( \Delta \) and a remarkable increase of the discontinuity.

The 2MA and the higher polytypes all of which contain the acentric 2MA behave completely different from the 2MC compound: the birefringence cannot be interpreted in terms of a free-energy expansion with even powers of the order parameter only. This deviation from the "normal" Landau theory and the symmetry of the 2MA lattice, both point to a Potts-type interaction as in the case of Pb\( _2 \)(PO\( _4 \))\( _2 \) (E. Salje, B. Wruck, Phys. Rev. (1983) B28, 6510). Therefore, we have to consider a term of third order in the Landau theory.

During these experiments, the results were often affected by multiple light beam reflection within the sample. In SOI the phenomenon occurs in a pronounced manner because of the ideal cleavage and the very high refractive indices, and it shows up as a wavyness of the monotonous birefringence curves. To get a feeling for the multiple reflection effects in birefringent plates, we performed calculations for the given experimental conditions and were able to reproduce the observations.