

## Phase behaviour of neopentylglycol up to 700 MPa<sup>☆</sup>

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In 1990, Suenaga, Matsuo and Suga [1] published the heat capacities and phase transitions of neopentylglycol (2,2-dimethyl-1,3-propanediol) at low temperatures and pressures; here a solid–solid phase transition ( $s_3 \rightarrow s_2$ ) was observed at 60.4 K. In the present study, the phase behaviour of neopentylglycol was measured by high-pressure DTA in the temperature range 300–370 K at normal pressure and at pressures up to 700 MPa. The apparatus and measuring method have been described elsewhere [2–4]. The neopentylglycol was obtained from Aldrich (purity 99%) and used without further purification.

Fig. 1 shows three typical thermograms of neopentylglycol at approx. 440, 640 and 666 MPa as obtained in the present investigations. Fig. 2 shows the temperature ( $T$ )–pressure ( $p$ ) phase diagram that results from the measurements.

The transition temperature for  $s_2 \rightarrow s_1$  was found to be 315 K at normal pressure. As the apparatus is not suitable for low temperature measurements, the transition temperature for  $s_3 \rightarrow s_2$  could not be determined at normal pressure. The  $s_2$  phase is pressure-limited. It is destabilized at a triple point where the three solid phases,  $s_1$ ,  $s_2$  and  $s_3$ , coexist (363 K, 646 MPa); the triple-point data were obtained from extrapolations of the experimental  $T(p)$  curves by third-degree polynomials.

The investigations are continuing [5].

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<sup>☆</sup> Dedicated to Hiroshi Suga on the Occasion of his 65th Birthday.

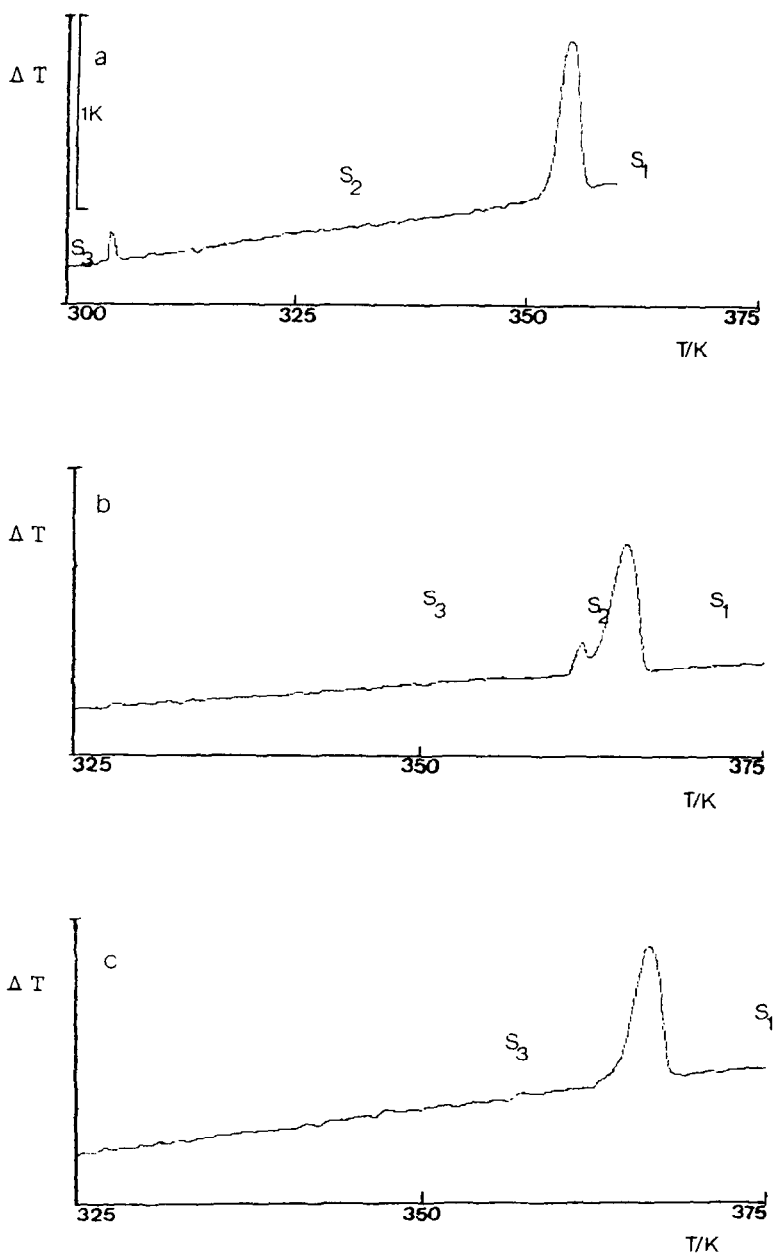


Fig. 1. Original DTA thermograms of neopentylglycol at approximately constant pressure [5];  $\Delta T$  between reference and sample is plotted against  $T$ . During heating, the pressure increases slightly; the material was obtained from Aldrich (purity 99%); sample cell, closed, no contact with furnace atmosphere; reference cell, empty; heating rate  $1 \text{ K min}^{-1}$ ; peaks correspond to endothermic phase transitions. (a) Phase transitions  $s_3 \rightarrow s_2$  (306 K) and  $s_2 \rightarrow s_1$  (353 K) at a pressure of about 440 MPa. (b) Phase transitions  $s_3 \rightarrow s_2$  (361 K) and  $s_2 \rightarrow s_1$  (363 K) at a pressure of about 640 MPa. (c) Phase transition  $s_3 \rightarrow s_1$  (365 K) at a pressure of about 666 MPa.

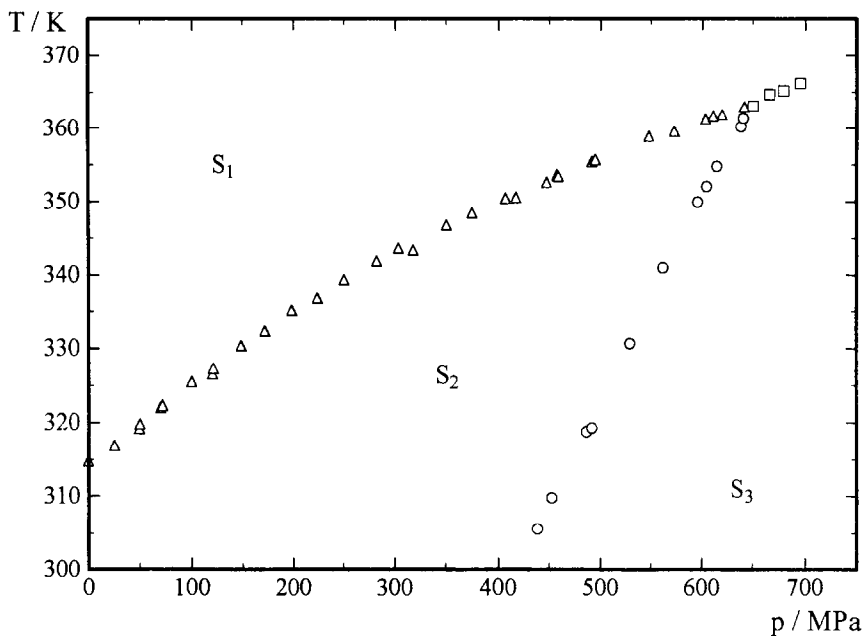


Fig. 2. Temperature ( $T$ )–pressure ( $p$ ) phase diagram of neopentylglycol [5].

### Acknowledgement

Financial support of the Fonds der Chemischen Industrie e.V. is gratefully acknowledged.

### References

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