

LETTERS TO THE EDITOR

THE VISCOSITY OF CHOLESTERYL OLEYL CARBONATE

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THE viscosity of cholesteryl oleyl carbonate was measured using the concentric cylinder viscometer (Model Rheotest 2 VEB, MLW Prüfgerate werk medingen sitz Freital). The measurements were made for different shear rates and at different temperatures in the cholesteric phase. Figures 1 and 2 show the variation of the viscosity with shear rates (sec^{-1}) and with temperature respectively. Here, the fluid is clearly non-Newtonian. The flow activation energy E^* in cholesteric and isotropic phases may be calculated using the relation given by Sakamoto *et al.*¹

$$\log \eta = \frac{E^*}{RT} + A \quad (1)$$

where η is the viscosity, R is the gas constant, T the temperature and A is a constant. The values of E^*

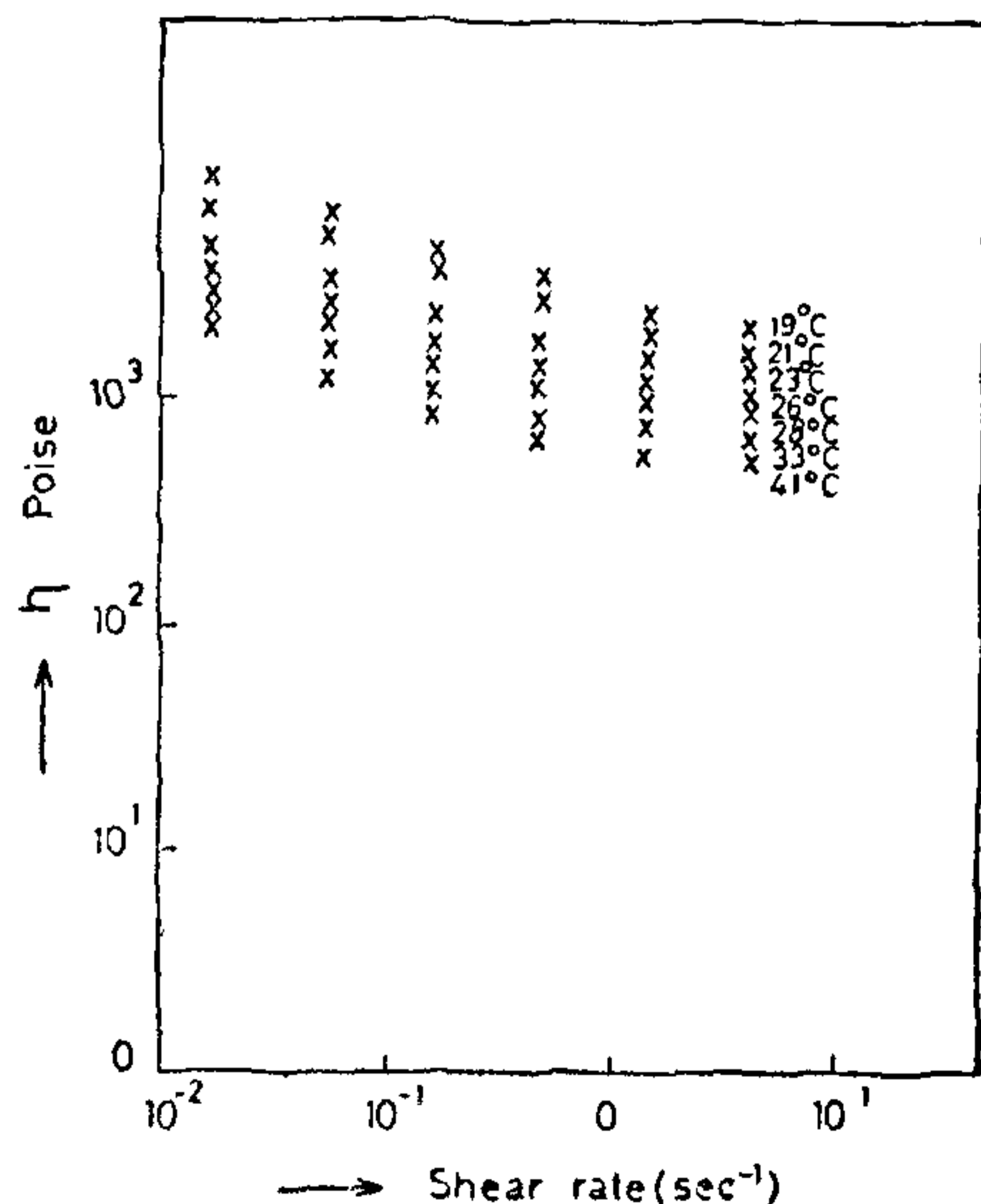


FIG. 1. Variation of the viscosity of COC with shear rate.

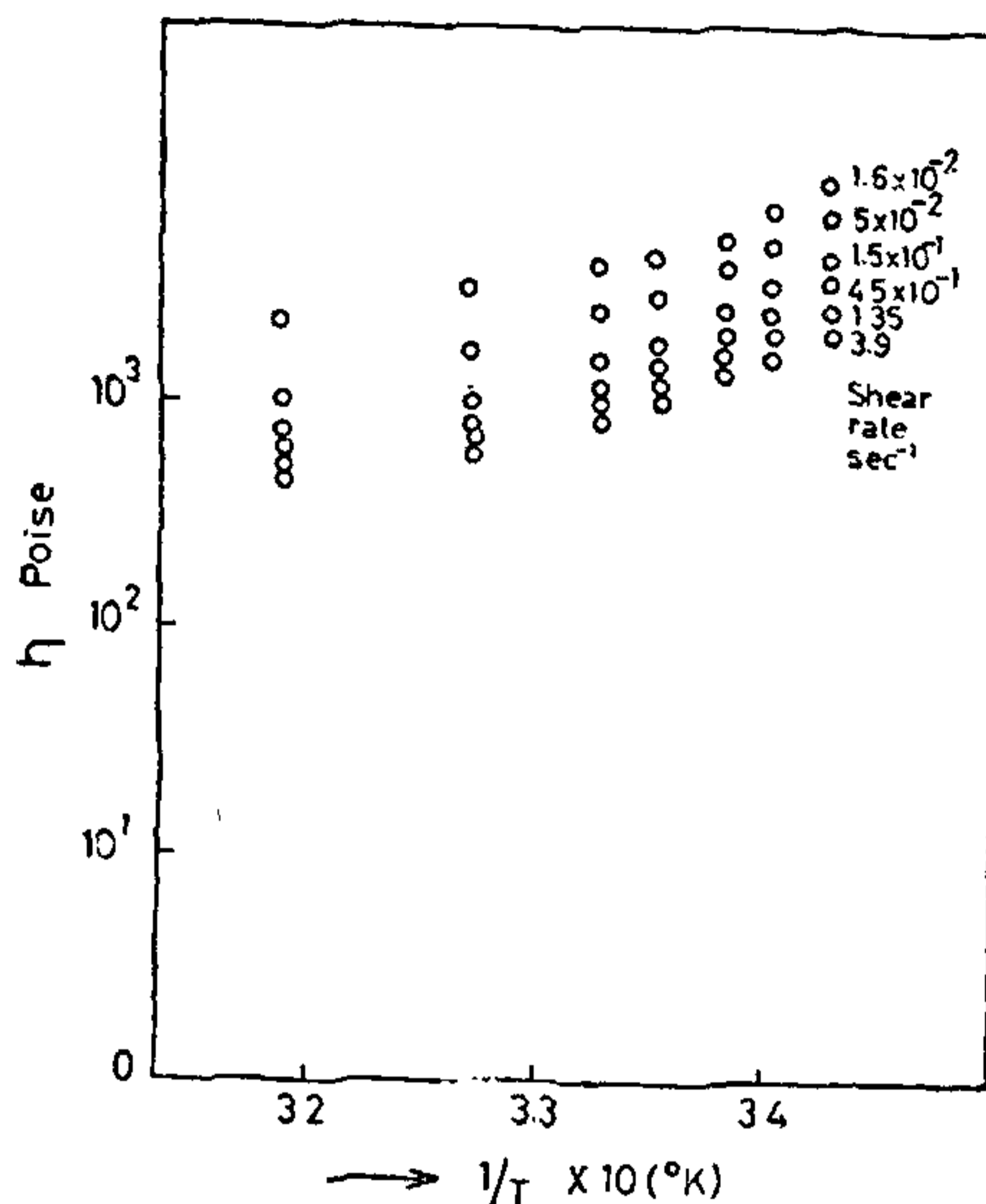


FIG. 2. Variation of the viscosity of COC with temperature.

are found to be 5.5 and 3.4 k.cal/mole respectively in the cholesteric and isotropic phase. The values are of the same order as reported by Sakamoto *et al.*, for the cholesteric compounds studied by them. For example, in the case of cholesteryl myristate, the values of E^* in the smectic and isotropic phases are 11 and 8.2 k.cal/mole respectively. The viscosity of COC does not vary so drastically with temperature as that of cholesteric myristate.

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1. Sakamoto, K., Porter, R. S. and Johnson, J. F., *Proceedings of the 2nd International Liquid Crystal Conference*, 1968, Part II, Ed. G. H. Brown (Gordon and Breach Science Publishers, London, 1969), p. 237.