Fig. 5 Resistance per unit rate of flow as a function of rate of flow, normalized to unity for the value of the viscosity found in an Ostwald viscometer (experimental).

relative rate of flow through two parallel porous regions is given by

$$u_1/u_2 = S_2^2/S_1^2$$

where subscripts 1 and 2 refer to the two regions and S is the specific surface area. The relative distance between constrictions is given by

$$d_1/d_2 = S_1/S_2$$

Hence the relative time the fluid takes to go from constriction to constriction is given by

$$t_1/t_2 = (S_1/S_2)^{1/3}$$

Consider the pattern of Fig. 2B. The peak at A occurs because $t=2\tau$ and the minimum at B because $t=4\tau$. Hence, if those overlap in the same porous medium

$$\frac{S_1 \text{ (in which A occurs)}}{S_2 \text{ (in which B occurs)}} = \left(\frac{2\tau}{4\tau}\right)^{1/3} = 0.8$$

$S_2 > S_1$ that is, the minimum viscosity (at B) occurs in the narrower pores and the maximum viscosity (at A) occurs in the wider pores, and $S_1 = 0.8S_2$ for that to occur. If, however, we apply the same considerations to B^1 and C^1 of Fig. 2C then

$$\frac{S_1 \text{ (in which } C^1 \text{ occurs)}}{S_2 \text{ (in which } B^1 \text{ occurs)}} = \left(\frac{6\tau}{4\tau}\right)^{1/3} = 1.15$$

Now $S_1 > S_2$ and the maximum viscosity occurs in the narrower pores (which would merely aggravate the situation). The theory would substantiate what appears at first sight to be the necessary condition, namely, the shear thickening peak which occurs at the higher velocity must be made to overlap the shear thinning peak which occurs at the lower velocity, not vice versa. Which peaks to take will depend on S_1/S_2 ; that is, for example, in Fig. 2C

$$\frac{S_1 \text{ (in which } C^1 \text{ occurs)}}{S_2 \text{ (in which } D^1 \text{ occurs)}} = \left(\frac{6\tau}{8\tau}\right)^{1/3} = 0.91$$

in contrast to 0.80 for A^1 to B^1 and for A to B.

Values of τ will depend on the properties of the polymer chosen and the solute chosen.

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Symmetry of SO_4 Ion in Gypsum

THE statement¹ "that the SO_4 ion in gypsum has only an axis of two-fold symmetry" is misleading and the new findings on symmetry should be restated. With the new parameters that we have found for it in gypsum the SO_4 ion, considered in isolation, forms a sphenoid in the point group $\bar{4}2m$ (tetragonal bispheoidal) and not a tetrahedron in the point group $\bar{4}3m$ (hexatetrahedral). In the gypsum structure it still conforms to the point group 2 (monoclinic sphenoidal).

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