DEPENDENCES OF THE MODULI OF ELASTICITY OF MAGNETIC FLUIDS ON THE PARAMETERS OF STATE

S. Odinaev, K. Komilov, A. Zaripov

Tadjik State National University
(*17, Rudaki Ave., Dushanbe 734025, Tajikistan;*
e-mail: k.komilov@mail.ru)

S u m m a r y

On the basis of dynamic expressions obtained earlier for the moduli of volume, $K(\omega)$, and shear, $\mu(\omega)$, elasticity and making use of a magnetic fluid composed of Fe_3O_4 magnetic particles in kerosene as an example, the numerical analysis of the dependences of those characteristics on the fluid state parameters has been carried out. The characters of the dependences for the relaxation volume, K_r, and shear, μ, moduli of elasticity on the concentration, density, and saturation magnetization were shown to be identical, namely, the growth of each of those parameters is accompanied by the growth of K_r and μ. The temperature growth gives rise to a linear decrease of both K_r and μ, whereas the growth of the magnetic field strength gradient to their linear increase. The results obtained agree with the experimental ones and confirm that the structural relaxation affects viscoelastic properties of magnetic fluids.