

# **RHEOLOGICAL PROPERTIES OF HIGHLY CONCENTRATED SUSPENSIONS USED FOR ELECTORRHEOLOGICAL MEDIA**

**S.O. Ilyin**

A.V.Topchiev Institute of Petrochemical Synthesis, RAS. Moscow, Russia

s.o.ilyin@gmail.com

Investigated highly filled suspensions are viscoplastic materials with a very peculiar rheological behavior. The material properties of these systems depend on their composition and can vary in the range of 10 times, at least.

The dynamic tests in the linear small amplitude region clearly indicate that they are solids with a modulus which does not depend in a very wide range of frequency.

If these materials are subjected to rate controlled regimes of deformation, their resistance to deformation expressed in terms of the "apparent viscosity" decreases monotonically. Meanwhile time dependence of the "viscosity" is observed and this effect is obliged to slow structure formation continuing in the range of several minutes.

If these materials are subjected to stress controlled regimes of deformation, they behave as elastic materials very low stress. The sharp drop in resistance to deformation classified as the yield is observed, and the suspension can flow in a narrow stress range. Finally, hardening occurs and the suspension becomes solid at high shear stresses.

The rheological properties of highly concentrated suspensions are characterized by an multi-valued stress-rate dependence, which can lead to self-oscillations in some range of material prehistory.