The anisotrophy of viscosity of magnetorheological fluid.

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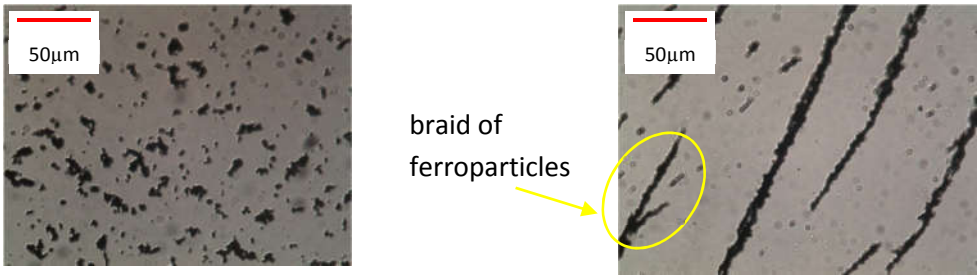
1. Introduction

The microsized (~10μm) ferroelements build the structure of magenthoreological (MR) fluid. This two phase material in neutral state behaves as a fluid but in magnetic field becomes a solid and has properties of elasto-viscoplastic material. This is due to the skeleton made by ferroelements connected into braids.

2. Measured the viscosity

Magneto active ferroelements are the particles connected together in the magnetic field.



a) b)

Fig. 1: The ferroelements in a neutral state (a) and under the influence of magnetic field (b).

The particles are immersed in the carrying fluid (e.g oil) and they are connected together if the magnetic field is strong enough. The beahviuor of MR Fluid can be tested by especially prepared device.

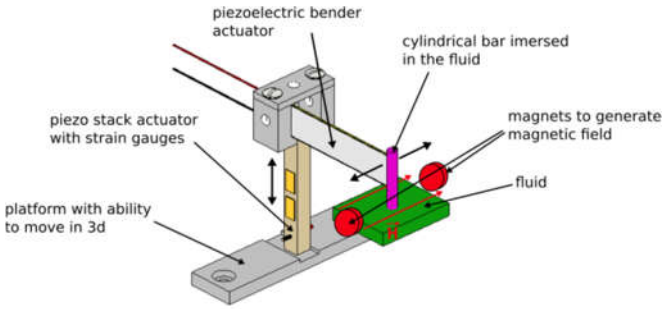


Fig. 2: The laboratory device

The laboratory set up is developed to test the viscosity by measured frequency response of material. The vibrating cylindrical bar is working in magnetorheological fluid shifting up the braids. The measured viscosity is depended on the direction of magnetic flux. During the test there are used three configuration – parallel to the direction of deflection cylindrical bar, orthogonal and at 45 degree angle.

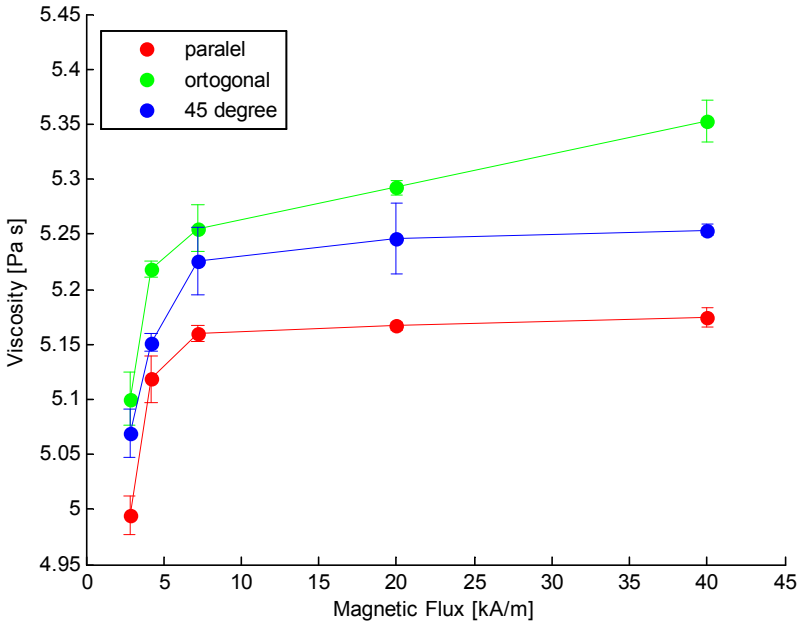


Fig. 3: The results.

3. Conclusions

The presented experimental observations make a basis for the formulation of theoretical description of elastic-viscoplastic deformation of MR fluids under the influence of magnetic field.

4.Acknowledgment

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