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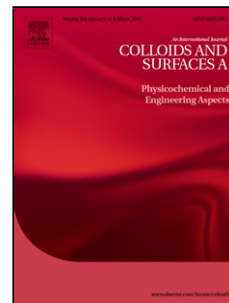
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# Enhancement in Viscoelastic Properties of Flake-Shaped Iron Based Magnetorheological Fluid Using Ferrofluid

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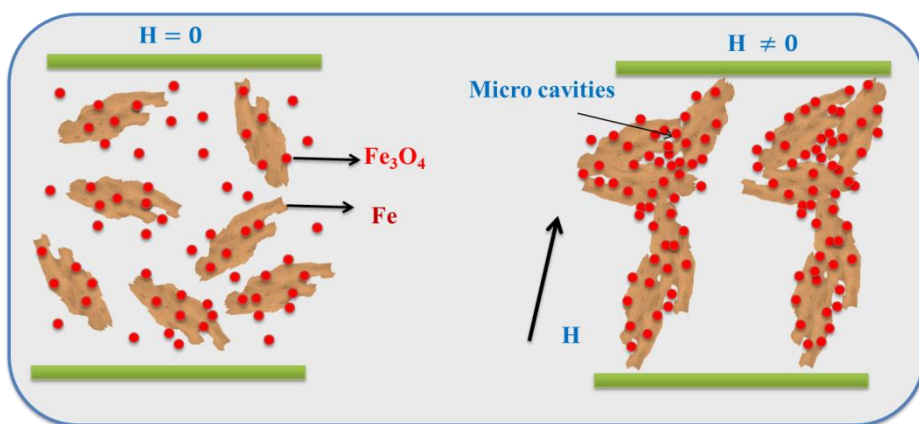
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## Enhancement in Viscoelastic Properties of Flake-Shaped Iron Based Magnetorheological Fluid Using Ferrofluid

### Graphical abstract

We investigate the effect of ferrofluid incorporated (5-20% v/v) flake-shaped iron particles in silicon oil based magnetorheological fluid. Bidispersed magnetorheological fluid samples show improved magnetoviscous and viscoelastic properties due to adsorption and colloidal bridge formation of nanoparticles.

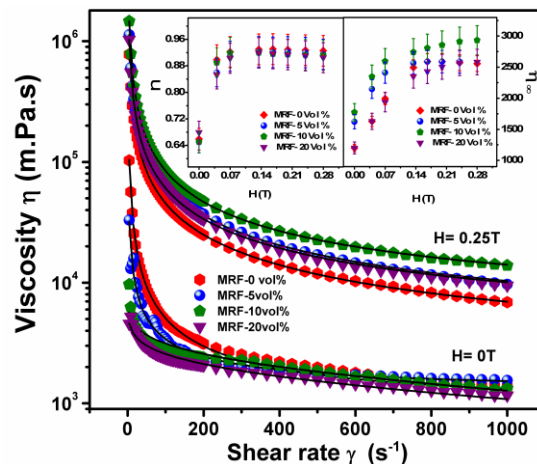
### Highlights



- $\text{Fe}_3\text{O}_4$  based ferrofluid was incorporated in flake shaped iron based MR fluid. Enhancement the stability and magnetoviscous properties.
- 10% ferrofluid concentration was established as optimum value to achieve maximum enhancement in MR fluid properties.
- An increase dynamic efficiency with ferrofluid incorporation was observed.

### Abstract

We have investigated the effect of ferrofluid incorporated (5-20% v/v) flake-shaped iron particles in silicon oil based magnetorheological fluid (MR fluid). The fluids physical properties like crystalline phase, shape size distribution and magnetization of both the fluids were studied individually. Thereafter, magnetic stimuli-response of ferrofluid doped MR fluid on rheological properties was determined in static and dynamic modes. The observed enhancement in yield stress due to addition of magnetic nanoparticles is correlated using universal yield stress scaling equation with magnetic field strength. Subsequently, cylindrical measurement technique is used to



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