

# Magnetorheological characterization of oil-in-oil magnetic Pickering emulsions

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A magnetic Pickering emulsion is a type of emulsion stabilized by magnetic nanoparticles that accumulate at the droplet interface. This makes the emulsion easy to control using an external magnetic field, which, in turn, makes it useful in many different applications. Research and development in this field are ongoing, and regardless of the application, the control of the formation process is necessary. Rheological measurements are one of the most important techniques for evaluating the internal structure and stability of emulsions. The main focus of the presented study is investigating the magnetorheological effect of the rarely tested oil-in-oil magnetic Pickering emulsions and comparing them with better-characterised oil-based magnetic fluids. The magnetoviscous effect typically occurs when magnetic nanoparticles or magnetic Pickering emulsions align with the magnetic field, and this effect depends mainly on the internal structure, such as size and shape.

The experimental results indicate that the magnetic emulsion treated by an electric field exhibits a higher dynamic yield stress as a function of the magnetic field compared to the partially covered droplets. This suggests that the stable emulsion becomes a more rigid system and more resistant to deformation when a magnetic field is applied. In addition, the magnetoviscous effect of the magnetic emulsions was lower compared to that of magnetic suspensions with the same mass fraction of magnetic nanoparticles.

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