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Interfacial Rheological Characterisation of Magnetorheological fluids at carrier fluid interface

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This study investigates the interfacial rheological characteristics of magnetorheological fluids in oil-based systems, with a focus on liquid–liquid interfaces, including particle-laden emulsions and multilayer films. In this work an interfacial shear rheology for MRFs without magnetic fields has been investigated, with an exclusive emphasis on the interfacial viscoelastic behaviour. Both experimental (using bi-conical IRS) and numerical simulation techniques are employed to assess the interfacial behaviour, and we thoroughly studied and quantified how MRFs particles form films and behave at the oil interface under different shear conditions. Our analysis establishes a direct link between interfacial rheological behaviour and interfacial structural organization, particularly particle coverage and network formation. Steady shear experiments and simulations visualize the evolution of interfacial particle assemblies, revealing irreversible rearrangements that govern viscoelastic behaviour.

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