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Computational Study of Fluid Particles

By Li, Xiaoyi

Condition: New. Publisher/Verlag: VDM Verlag Dr. Müller | Dynamics of Drops, Rheology of Emulsions, and Mechanics of Biological Cells | A computational study of drops, capsules, cells and their emulsions is presented here motivated by their diverse applications in industries and biological science. Particle deformation is the focus of this study. Front-tracking method is developed to investigate deformation and interactions. Inertia-induced drop behavior gives rise to unusual rheological responses such as shear thickening and a sign change of normal stresses in shear, and a negative elastic modulus in an oscillating extensional flow. Simulation is also applied to explore the mechanics of capsules and biological cells with constitutive models for membrane elasticity and molecular adhesion incorporated into the numerical framework. Cell deformation induces a hydrodynamic lift affecting cell adhesion to a substrate. Deformable cells detach from the substrate at the same bond parameters where rigid ones do not, indicating importance of deformation on the leukocyte adhesion cascade. | Format: Paperback | Language/Sprache: english | 388 gr | 292 pp.



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