

Abstract Submitted
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Break-up of synthetic capsule in shear flow SEYEONG JEONG, DAEGYOUM KIM, KAIST — A capsule, a thin elastic membrane enclosing inner material such as colloid, has been used in diverse fields including drug delivery, cell encapsulation and cosmetics. The structural robustness of the capsule comes to an important issue for drug delivery because hydrodynamic shear stress acting on the membrane surface of the capsule in microcirculation environment may cause severe deformation and burst of the capsule. Previously, many studies have focused on the rheological behavior of the capsule immersed in simple flows such as shear flow, extensional flow or Poiseuille flow in small and moderate ranges of shear rate. However, little is known for the deformation of a capsule in high shear rate and furthermore its break-up phenomenon. For the break-up of a capsule in simple shear flow, experiment is performed with a flow rheoscope, and a capsule based on Human Serum Albumin is prepared. The capsule is modelled as a 2D thin shell by adopting the concept of hyperelasticity. The deformation and fracture of a capsule and the resultant stress distribution on the capsule surface are investigated by changing the mechanical properties of the capsule and the shear rate of the flow.

Seyeong Jeong
KAIST

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