

Abstract Submitted
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The dynamics of adhesion of a pair of vesicles JOHANN WALTER,
L. GARY LEAL, University of California, Santa Barbara, Dept. of Chemical Engineering — Adhesive interactions within a suspension of vesicles, such as many personal care products, vectors for drug delivery or artificial blood, can lead to aggregation of the vesicles and dramatic changes to the properties of the suspension. We study the adhesion of a pair of unilamellar, charged vesicles under flow, in the presence of a non-adsorbing polymer or micelle creating a depletion attraction force between the vesicles. Simulations are conducted using a numerical model coupling the boundary integral method for the motion of the fluids and a finite element method for the membrane mechanics (resistance to bending and area increase are both taken into account). The dynamics of the drainage process are studied. At steady state, the adhesion energy is found to depend greatly on the ability of the vesicles to increase their surface area. Finally, when the vesicles are separated in an elongational flow, different behaviors are observed depending on the deformability of the vesicles: an increase of the film thickness with a constant contact area, or peeling-off phenomenon where the contact area decreases at constant film thickness.

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