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Flow-induced segregation in confined multicomponent suspensions: Effects of particle size and rigidity MICHAEL GRAHAM, AMIT KUMAR, University of Wisconsin-Madison — The effects of particle size and rigidity on segregation in confined flow of binary suspensions of fluid-filled capsules are investigated in a model system resembling whole blood. We study this problem using a boundary integral method as well as with a master equation model that incorporates wall-induced migration and hydrodynamic pair collisions. Boundary integral results indicate that, in a mixture of large and small particles, the small particles marginate, while the large particles antimarginate. Here margination refers to localization of particles near walls, while antimargination refers to the opposite. In a mixture of particles with equal size and unequal stiffness, the stiffer particles marginate while the flexible ones antimarginate. The master equation model traces the origins of these behaviors to the size and rigidity dependence of the wall-induced migration velocity and of the cross-stream particle displacements in various types of collisions. Finally, a set of coupled non-local drift-diffusion equations is derived, providing further insights in terms of the drift and diffusion of various species.

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