Abstract Submitted
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Intra-phase mixing in a bi-component translating drop THOMAS WARD, Iowa State University — The intra-phase mass transport in a translating spherical drop containing two species will be studied numerically in the zero capillary number limit. The problem is relevant to microfluidic systems where it is common to form two drops of unequal or nearly equal volume in a microfluidic channel where they subsequently merge and then translate. The mixing process in this system is controlled by diffusion due to the small length scales despite the relatively large velocities and low diffusivities. The species conservation equation are discretized using a $4th$ order finite difference scheme in space with an adaptive explicit Runge-Kutta-Merson scheme to advance in time. With this scheme the solutions conserve mass throughout the numerical integration cycle. Numerical data for Peclet numbers ranging between 1000-10000 will be used to estimate the deviation from the equilibrium concentration as a function of time. Initial species concentration range from ratios of 1:9 to 1:1.

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