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The Dispersion of Particles within Foams

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Particle motion within foams or froths is of great importance to processes such as mineral flotation. One of the aspects of this motion is the dispersion of unattached particles relative. This paper examines this dispersion. The main focus of this paper is the dispersion in the direction parallel to the net fluid motion. This dispersion is brought about due to the velocity profiles found within individual Plateau borders and is thus referred to as Plateau border dispersion. It was found that, despite the laminar nature of the flows, there was sufficient radial mixing within individual Plateau borders that the dispersion profiles were very much like those found for diffusion, rather than the more angular profile that would be expected for purely convective dispersion. A Peclet number with the radius of curvature of the Plateau borders as characteristic length scale was found to be appropriate for characterising this dispersion. This Peclet number was found to be constant w.r.t. both the bubble size and the Plateau border Renolds number. The Peclet number obtained in this work for both particle and liquid dispersion was found to be about 0.15.

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