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On the Dynamics of an Oil Encapsulated Bubble JOEL KARP, ERNESTO MANCILLA, RIGOBERTO MORALES, Federal University of Technology-Parana — The dynamics of an oil encapsulated bubble was experimentally investigated. High-speed imaging was employed in the visualization of the motion of a coated bubble rising in quiescent tap water. The attachment of a bubble with diameter ranging from 300 to 3000 m to a 2.3 mm oil droplet resulted in two different regimes: oscillatory and non-oscillatory motion. The influence of the properties of the oil coating was investigated by employing three different oils, which were found to be more influential when no motion instabilities were observed and viscous forces dominate. Path oscillations decreased for the encapsulated bubble, being up to five times smaller in comparison with an isolated bubble with similar diameter. The oil coated bubble presented higher terminal velocity in comparison to a rising oil droplet, with increase factors from 100 up to 400%. The shape deformation of the encapsulated bubble was less than 15% within the diameter range evaluated, being essentially spherical in comparison to correspondent isolated bubbles. Transient motion assays indicated that developed regime was achieved in approximately half the rising distance than for isolated bubbles, after which a periodic oscillation of the velocity components was observed.

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