

Abstract Submitted  
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**Behavior of self-propelled acetone droplets in a Leidenfrost state on liquid substrates** STOFFEL JANSSENS, ELIOT FRIED, Okinawa Institute of Science and Technology Graduate University 1919-1 Tancha, Onna-son, Kunigami-gun, Okinawa, Japan 904-0495 — It is demonstrated that non-coalescent droplets of acetone can be formed on liquid substrates. The fluid flows around and in an acetone droplet hovering on water are recorded to shed light on the mechanisms which might underlie non-coalescence. For sufficiently low impact velocities, droplets undergo a damped oscillation on the surface of the liquid substrate but at higher velocities clean bounce-off occurs. Comparisons of experimentally observed static configurations of floating droplets to predictions from a theoretical model for a small non-wetting rigid sphere resting on a liquid substrate are made and a tentative strategy for determining the thickness of the vapor layer under a small droplet on a liquid is proposed. That strategy is based on the notion of effective surface tension. The droplets show self-propulsion in straight line trajectories in a manner which can be ascribed to a Marangoni effect. Surprisingly, self-propelled droplets can become immersed beneath the undisturbed water surface. This phenomenon is reasoned to be drag-inducing and might provide a basis for refining observations in previous work.

Stoffel Janssens  
Okinawa Institute of Science and Technology Graduate University

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