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Dynamic Leidenfrost temperature for impact of droplets on micro-structured surfaces HENDRIK J.J. STAAT, TUAN TRAN, Physics of Fluids Group, Faculty of Science and Technology, University of Twente, 7500AE Enschede, The Netherlands, ARTURO SUSARREY ARCE, Catalytic Processes and Materials Group, Faculty of Science and Technology, University of Twente, 7500AE Enschede, The Netherlands, TOBIAS C. FOERTSCH, Physics of Fluids Group, Faculty of Science and Technology, University of Twente, 7500AE Enschede, The Netherlands, ARIE VAN HOUSELT, Catalytic Processes and Materials Group, Faculty of Science and Technology, University of Twente, 7500AE Enschede, The Netherlands, HAN GARDENIERS, Mesoscale Chemical Systems Group, Faculty of Science and Technology, University of Twente, 7500AE Enschede, The Netherlands, ANDREA PROSPERETTI, DETLEF LOHSE, CHAO SUN, Physics of Fluids Group, Faculty of Science and Technology, University of Twente, 7500AE Enschede, The Netherlands — When a droplet impacts a surface heated above the liquid's boiling point, the droplet either contacts the surface and boils immediately, (contact boiling) or is supported by a developing vapor layer and bounces back (film boiling & Leidenfrost state). We study the transition between these two different behaviors and how it is affected by the control parameters such as impact velocity and controlled roughness (i.e., micro-structures fabricated on silicone surfaces). Additionally, in the film boiling regime, we show that the resident time of the droplet impact is insensitive to the velocity, the surface temperature, and the structure's geometry. In the contact boiling regime, we show that the structured surfaces induce the formation of liquid jets emerging during the spreading stage of the impacting droplets.

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