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Film Levitation of Droplet Impact on Heated Nanotube Surfaces FEI DUAN, WEI TONG, LU QIU, Nanyang Technological University — Contact boiling of an impacting droplet impacting on a heated surface can be observed when the surface temperature is able to activate the nucleation and growth of vapor bubbles, the phenomena are related to nature and industrial application. The dynamic boiling patterns us is investigated when a single falling water droplet impacts on a heated titanium (Ti) surface covered with titanium oxide (TiO2) nanotubes. In the experiments, the droplets were generated from a flat-tipped needle connected to a syringe mounted on a syringe pump. The droplet diameter and velocity before impacting on the heated surface are measured by a high-speed camera with the Weber number is varied from 45 to 220. The dynamic wetting length, spreading diameter, levitation distance, and the associated parameter are measured. Interesting film levitation on titanium (Ti) surface has been revealed. The comparison of the phase diagrams on the nanotube surface and bare Ti surface suggests that the dynamic Leidenfrost point of the surface with the TiO2 nanotubes has been significantly delayed as compared to that on a bare Ti surface. The delay is inferred to result from the increase in the surface wettability and the capillary effect by the nanoscale tube structure. The further relation is discussed.

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