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**Evolution of vapor into a Leidenfrost layer during drop impact** SANG JUN LEE, JI SAN LEE, NAMSEOP KWON, POSTECH, BYUNG MOOK WEON, Sungkyunkwan University, KAMEL FEZZAA, Argonne National Laboratotry, JUNG HO JE, POSTECH — When a liquid drop impacts a solid surface heated above the Leidenfrost temperature, the drop rebounds, known as Leidenfrost effect. This phenomenon plays an important role in many cooling and transfer processes involved in fuel combustion or spray cooling. In this study, we investigated the evolution of vapor into a Leidenfrost layer during drop impact using ultrafast X-ray phase-contrast imaging that allowed us to directly visualize the dynamic profiles of drop impact at 150 – 550C. Initially, we find that nucleation of vapor occurs during drop spreading, forming vapor bubbles. We then reveal that vapor bubbles collapse on the solid surface during drop recoiling, contributing to the formation of a Leidenfrost layer. Furthermore, we studied the effects of temperature and impact velocity on the bouncing dynamics of the drop.

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