

Abstract Submitted
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Droplet impact on a fiber¹ SUNG-GIL KIM, TAEHONG KIM, WON-JUNG KIM, Sogang Univ — We present the results of a combined experimental and theoretical investigation of drop impact on a fiber. We use high-speed videography to characterize the dynamics of drops impacting fibers. Our systematical experiments reveal that the outcome of droplet collision critically depends on the relative magnitude of inertial to capillary forces and the ratio of the thickness of fiber to the diameter of the drop. We identify three outcomes of the collision using a non-dimensional regime map. The selection among the modes of single capturing, single drop falling, and divided drop falling is explained through a scale analysis of forces. We also examine the droplet retention on the fiber after impact. For each mode, we suggest the mathematical models to predict the amount of residual water on the fiber. Our study can be extended to predicting the remaining droplet, the critical problem in air filtration, water collection, and fiber coating.

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