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Droplet Impact on dry solid surfaces: Traditional vs Bio-mimetic SAPTARSHI BASU, DURBAR ROY, Department of Mechanical Engineering, Indian Institute of Science, KHUSHBOO PANDEY, Interdisciplinary Center for Energy Research (ICER), Indian Institute of Science, RABIBRATA MUKHERJEE, Department of Chemical Engineering,Indian Institute of Technology,Kharagpur — An experimental study of droplet impact has been conducted on four different substrates (2 traditional and 2 bio-mimetic) in the impact Weber number range of 6 to 130. The droplet shape dynamics have been visualized using high speed shadowgraphy (at 10 kHz). Glass and PDMS are the traditional substrates, whereas the other two surfaces are inspired by rose-petal and lotus-leave micro-structures. Various regimes are demarcated for all the substrates depending on the impact Weber number. The receding rebound, and breakup mechanisms of bio-mimetic surfaces are found to be strikingly different from that of the traditional substrates. Dimensional analysis, scaling arguments and energetics have been utilized to unearth the underlying dynamics of the impact.

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