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Drop splashing: the role of surface wettability and liquid viscosity. HAMED ALMOHAMMADI, ALIDAD AMIRFAZLI, York University, - TEAM — There are seemingly contradictory results in the literature about the role of surface wettability and drop viscosity for the splashing behavior of a drop impacting onto a surface. Motivated by such issues, we conducted a systematic experimental study where splashing behavior for a wide range of the liquid viscosity (1-100 cSt) and surface wettability (hydrophilic to hydrophobic) are examined. The experiments were performed for the liquids with both low and high surface tensions (˜20 and 72 mN/m). We found that the wettability affects the splashing threshold at high or low contact angle values. At the same drop velocity, an increase of the viscosity (up to 4 cSt) promotes the splashing; while, beyond such value, any increase in viscosity shows the opposite effect. It is also found that at a particular combination of liquid surface tension and viscosity (e.g. silicone oil, 10 cSt), an increase in the drop velocity changes the splashing to spreading. We relate such behaviors to the thickness, shape, and the velocity of the drop's lamella. Finally, to predict the splashing, we developed an empirical correlation which covers all of the previous reported data, hence clarifying the ostensible existing contradictions.

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