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Break up of Polymer Solution Drop Impacting a Small Target

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To investigate the effects of high molecular polymeric additives on the splashing of a drop impacting a solid, we used small disk-like targets. Such type of impact allows to “switch off” the viscous friction between the liquid and the solid and therefore to observe the drop splashing with a minimal number of influential factors. It was found that the polymeric additives suppressed the drop disintegration into secondary droplets because of the formation of thinning filaments between the droplets and the main drop, which prevented the droplets from detaching and forced them to coalesce back with the main drop. A splashing threshold criterion could be derived from the balance between the liquid inertia, the capillary forces and the liquid elasticity.

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