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Impact and rebound behaviors of polymer solution droplets with different concentrations and molecular weights HYUNG KYU HUH, SANG JOON LEE, POSTECH — The spreading and rebounding behaviors of diluted polyehtyleneoxide(PEO) solution droplets impacted on a Teflon-coated surface are experimentally investigated using a high-speed imaging technique. The maximum spreading of PEO droplets are well fitted in a single curve, regardless of the polymer concentration. Additional energy dissipation by polymer additives is increased during the retraction phase of droplets, as the polymer concentration increases. Polymer solution of high molecular weight dissipates more energy, compared to that of low molecular weight. There is no significant effect on the energy dissipation, when the polymer concentration is smaller than 0.03wt%. Polymer residue composed of small satellite droplets is optically observed after retraction of droplet contact line. Contact-line velocity on the residue area is decreased, because the residue works as an additional friction on the surface. The friction coefficient of polymer solution is increased linearly as the reduced concentration of polymer solution increases. A semi-empirical model is derived to estimate the rebound tendency of PEO droplets as a function of the maximum spreading factor, the retraction velocity and the reduced concentration.

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