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Residues formation on surface of heated wire after drop impact: correlation between solution drop impact dynamics and residues thickness KYEONGMIN KIM, SANG JUN LEE, WONJOON CHOI, Korea University — Impact between solid structures and solutions essentially leaves residues on surfaces, such as calcite in water. While the impacting angle and velocity of the solution affect the formation of the residues, the temperature regime of the solid surface is another significant factor because it intrinsically manipulates the contact interfaces between liquids and solids, as well as the solubility. Herein, we report a systematic study of the residual nanomaterials after a drop impact containing carbon nanotubes (CNTs) on a heated metal wire in various temperature range. While a drop casting method for the individual droplet comprising CNTs induces the impact with 2-mm nichrome wires in diameter, a joule-heating method controls the wire temperature in 25-400 C. The phase diagram in terms of the impact velocity, wire temperature, and formation of the residues are quantitatively investigated to elucidate the correlation between the solution drop impact dynamics and the resulting CNT residue thicknesses. The fundamental understanding of the residual nanomaterials, induced by the impact between solid structures and solutions in wide temperature ranges would provide the insight for a robust design of broad engineering systems such as heat exchangers, solar power modules, and turbines.

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