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Solute concentration-dependent contact angle hysteresis and evaporation stains

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The presence of non-volatile solutes in a liquid drop on a solid surface can affect the wetting properties. Depending on the surface-activity of the solutes, the extent of contact angle hysteresis (CAH) can vary with their concentration and the pattern of the evaporation stain is altered accordingly. In this work, four types of concentration-dependent CAH and evaporation stains are identified for a water drop containing polymeric additives on polycarbonate. For polymers without surface-activity such as dextran, advancing and receding contact angles (qa and qr) are independent of solute concentrations and a concentrated stain is observed in the vicinity of the drop center after complete evaporation. For polymers with weak surface-activity such as polyethylene glycol (PEG), both qa and qr are decreased by the solute addition and the stain pattern varies with increasing PEG concentration, including a concentrated stain and a mountain like island. For polymers with intermediate surface-activity such as sodium polystyrene sulfonate (NaPSS), qa descends slightly but qr decreases significantly after addition of a substantial amount of NaPSS and the ring-like stain pattern is observed. Moreover, the size of the ring stain can be controlled by the NaPSS concentration. For polymers with strong surface-activity such as poly (vinyl pyrrolidone) (PVP), qa remains essentially a constant but qr is significantly lowered after addition of a small amount of PVP and the typical ring-like stain is seen.

Biography

Yueh-Feng Li is a PhD student from National Central University in Taiwan from the Department of Chemical and Material Engineering. He has published 06 papers on reputed journals, such as *Langmuir, Applied Physic Letters,* and *Journal of Chemical Physics.* The submitted paper has great relationship with nanotechnology, such as nanoparticle self-assembly and ink-jet printing.

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