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Effect of relative humidity on contact angle of inkjet-printed evaporating colloidal drops VIRAL CHHASATIA, ABHIJIT JOSHI, YING SUN, Drexel University — The deposition behavior of inkjet-printed aqueous colloidal drops onto glass and polymer (PEN and PET) substrates has been investigated by using fluorescence microscopy, a high-resolution CCD camera, and scanning electron microscopy. Real-time side-view images show that the contact angle of an evaporating colloidal drop is a function of the ambient humidity. The relative humidity also affects the extent to which the drop is able to spread after impacting a substrate, the evaporation rate at the drop surface, and the evaporatively-driven flow inside the drop that drives the suspended particles towards the contact line. The difference between the contact line velocity and liquid velocity at the drop contact line induced by evaporation creates a larger contact angle compared to that of the case without evaporation. This increase in contact angle becomes more significant for a low ambient humidity. Results also show that the particle deposition area and pattern change with the ambient humidity.

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