

Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Self-sorting of bi-dispersed colloidal particles near contact line of an evaporating sessile droplet. RAJNEESH BHARDWAJ, NAGESH PATIL, ATUL SHARMA, Indian Institute of Technology Bombay, Mumbai — Self-sorting of bi-dispersed micrometer and sub micrometer polymer particles near the contact line of an evaporating sessile water droplet is investigated on non-heated and heated silicon wafer. On the non-heated silicon, a hilly accumulation of particles forms after droplet drying due to the early depinning of the contact line, while on the heated silicon, self-sorting at the contact line is observed within the ring at the contact line. SEM images reveal morphology of sorted patterns of bi-dispersed colloids. The receding contact angle reduces due to substrate heating and it helps to forming a stagnation region developed by the Marangoni flow near the contact line [Patil et al., *Langmuir*, 32(45), 2016]. The sorting within the ring occurs due to curvature of liquid-gas interface and preferential deposition of smaller sized particles in the stagnation region as compared to the larger size particles. Our measurements show that there exists a critical particle-size ratio and substrate temperature to achieve the sorting. The experimental results are compared with a mechanistic model.

Rajneesh Bhardwaj
Indian Institute of Technology Bombay, Mumbai

Date submitted: 30 Jul 2017

Electronic form version 1.4