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Harnessing Compositional Marangoni Flows in Depositing Nanoparticle Films MAINAK MAJUMDER, Monash University, Clayton, Victoria, Australia, MATTEO PASQUALI, Rice University, Houston, Texas, USA, MONASH UNIVERSITY/RICE UNIVERSITY TEAM — Attempts at depositing uniform films of nanoparticles by drop-drying have been frustrated by the "coffee-stain" effect, arising from the convective macroscopic flow into the solid-liquid-vapor contact line of a droplet. We have recently demonstrated that uniform deposition of nanoparticles from aqueous suspensions can be obtained by drying the droplet in an ethanol vapor atmosphere .(.).....(Majumder et al., 2012). This technique allows the particle-laden water droplets to spread on a variety of surfaces such as glass, silicon, mica, PDMS, and even Teflon® due to absorption of ethanol from the vapor. Visualization of droplet shape and internal flow shows initial droplet spreading and strong re-circulating flow during spreading and shrinkage. During the drying phase, the vapor is saturated in ethanol, leading to preferential evaporation of water at the contact line; thereby generating a surface tension gradient (or Marangoni forces) that drive a strong recirculating flow. We show that this method can be used for depositing catalyst nanoparticles for the growth of single-walled carbon nanotubes as well as to manufacture plasmonic films of well-spaced, unaggregated gold nanoparticles. .MAJUMDER, M., RENDALL, C. S., PASQUALI, M. et al. 2012. Overcoming the "Coffee-Stain" Effect by Compositional Marangoni-Flow-Assisted Drop-Drying. *J.Phys.Chem.B,* 116**,** 6536-6542.

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