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Spreading dynamics of superposed drops of two liquids on a spinning disk SUBHADARSHINEE SAHOO, ASHISH ORPE, Chemical Engineering Division, CSIR-National Chemical Laboratory, Pune, India 411008, PANKAJ DOSHI, Pfizer, Inc., Groton, Connecticut, USA — We have experimentally studied simultaneous spreading of two liquid drops, one engulfing the other, when rotated atop a horizontal spinning disk using flow visualization technique. A drop of high surface tension liquid is placed centrally on a horizontal disk followed by a drop of second liquid placed exactly above the first. The second liquid, of higher volume, lower surface tension and lower density than the first, engulfs the first drop completely. The disk is then rotated at a desired speed for a range of volume ratios of two liquids. The spreading behavior of both the drops is captured using a high speed camera. Such an arrangement of two liquids drops does not affect the spreading behavior of the outer liquid, but influences that of the inner liquid significantly. The drop spreads to a larger extent and breaks into more fingers as compared to the case where the same liquid is spreading in the absence of outer liquid. The fingering instability is achieved at earlier times with decreasing volume ratios, indicative of the increasing influence of the edge of outer liquid film being closer to that of the inner liquid. Further, sustained rotation of the disk leads to emanation of drops from the spreading drop travelling outwards through the fingers of outer liquid.

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