

Abstract Submitted
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Elastic membrane for needle-free drop deposition PRASHANT WAGHAMRE, SUSHANTA MITRA, Department of Mechanical Engineering, University of Alberta — Contact angle measurements on low-energy surfaces (like superhydrophobic, etc.) are often a challenge as the needle-drop-surface combination does not allow to detach the drop readily. Here we present a new technique to achieve a “needle-free” drop by bringing the drop in contact with an elastic membrane, kept between the needle-drop assembly and the characterizing substrate. The detachment of the drop from the needle is achieved by retracting the needle-drop assembly at a finite speed and allowing the drop to receive the elastic energy of the soft flexible membrane. Such interaction of the drop with the elastic membrane permits the drop to get repelled from the elastic membrane and gets deposited on a characterizing substrate. The repelling behavior of the drop can be controlled by appropriately selecting the mechanical and wetting properties of the elastic membrane. This technique not only provides a needle-free drop deposition that is independent of the physical properties of the liquid and the needle but it also allows achieving the drop size that is independent of the needle diameter.

Prashant Waghmare
University of Alberta

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