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Analytical study for vapor-driven solutal Marangoni flows inside a sessile droplet[1] JUNIL RYU, JUNKYU KIM, JONGHYEOK PARK, HYOUNGSOO KIM, KAIST — Flow control inside a sessile droplet is important in microfluidic mixing, materials patterning and coating applications. Recently, a solutal Marangoni flow driven by a vapor of volatile liquid has been introduced as a novel way of flow controller and mixer, which does not require external devices and pollute mixing samples. In this talk, we will present the controlled flow patterns and efficient mixing inside a sessile droplet using solutal Marangoni effects. Furthermore, we developed a theoretical model to predict the vapor-driven solutal Marangoni flows. By matching the experimental and theoretical results, we estimate the profile of vapor distribution of volatile liquid, which is very difficult to directly measure from experiments. Using this analytical model, we further investigate how the boundary condition changes the internal flow pattern. Several possible cases will be discussed during the talk.

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