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Infrared visualization of flow motion inside a sessile drop under evaporation DAVID BRUTIN, FABRICE RIGOLLET, CHRISTOPHE LE NILIOT, Aix-Marseille University - IUSTI, TCM TEAM — Drop evaporation is a simple phenomena but still unclear concerning the evaporation mechanisms. A common agreement of the scientific community based on experimental and numerical work evidence that most of the evaporation occurs at the triple line; however, the rate of evaporation is still predicted empirically due to the lack of knowledge on the convection which develops inside the drops under evaporation. The evaporation of sessile drops is more complicated than it appears due to the conduction coupling with the heating substrate, the convection and conduction inside the drop and the convection and diffusion with the vapour phase. The coupling of heat transfer in the three phases induces complicated cases to solve even for numerical simulations. In the present work, we present recent experimental results obtained using infrared thermography (infrared camera coupled with a microscopic lens of 10 μm of resolution) to visualize flow motion inside sessile drops under evaporation. The wavelength range (3-5 μm) is adapted to the observed fluid (99.9% ethanol) since it is semi-transparent in that wavelength range. It is then possible to observe qualitatively inside the drop the convection cells appearance, evolution and disappearance. The relation between the convection cells and the heat transfer from the substrate to the drop is evidenced is this work.

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