

Abstract Submitted  
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**Crystallisation-Induced Flows in Evaporating Aqueous Saline Drops** MARINA EFSTRATIOU, JOHN CHRISTY, KHELLIL SEFIANE, Institute of Multiscale Thermofluids, School of Engineering, University of Edinburgh — When aqueous saline droplets are left to dry on hydrophilic glass slides, a ring of spaced crystals is formed. However, no experimental work has yet linked the flows arising in these droplets with the final crystal ring deposition. In our work, we have performed micro-PIV (Particle Image Velocimetry) to examine the link between the flow along the base of the drop and the final deposit. We report for the first time the existence of a nucleation-driven flow within the droplets which appears to be responsible for the formation of the crystal ring on the periphery of the drops. Three evaporation stages were observed. During stage I, a generally outward flow is manifested driven by evaporative flux, since the evaporation rate is higher on the periphery. After stage I, a transition stage II is shown during which the flow almost momentarily pauses, that is believed to occur at the point where the concentration near the periphery is that of the incipient nucleation. Stage III is governed by the appearance of strong flow jets, directed at the growing crystal, and vortices to either side of the crystal. This flow regime is driven by concentration gradients occurring due to crystal nucleation, demonstrating for the first time how crystal nucleation affects the flow.

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