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Liquid film dryout in vertical two-phase annular flow in a rectangular channel ROMAN MORSE, University of Wisconsin - Madison, TIAGO MOREIRA, University of Sao Paolo / University of Wisconsin - Madison, KRISTOFER DRESSLER, University of Wisconsin - Madison, GHERHARDT RIBATSKI, University of Sao Paolo, LOUISE MCCARROL, EVAN HURLBURT, Naval Nuclear Laboratory, GREGORY NELLIS, ARGANTHAL BERSON, University of Wisconsin - Madison, HEAT TRANSFER RESEARCH GROUP, USP COLLABORATION, MULTIPHASE FLOW VISUALIZATION AND ANALYSIS LABORATORY, UW-MADISON COLLABORATION — The entire liquid-film dryout process in a vertical two-phase annular flow is characterized experimentally, from inception to completion. This study presents experiments conducted using saturated R245fa at high vapor qualities (0.84 to 0.99) in a rectangular channel with a hydraulic diameter of 18 mm with aspect ratio of 1/3. The walls of the test section are made of glass coated with Fluorine-doped Tin Oxide (FTO). Heat fluxes up to 30 kW/m^2 are generated at the inner surface of the window by passing an electrical current through the FTO coating. Instantaneous pressure and temperature in the test section, temperature on the outer wall of the test section, and high-speed videos were recorded simultaneously during the dryout event. In addition, the state (wet or dry) of the heated surface was measured using thermoreflectance as a function of time. During the inception of dryout, dry patches on the heated surface may rewet intermittently. The ability of the surface to rewet near dryout is studied under steady state and pulsatile conditions.

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