Transition Boiling on Superhydrophobic Surfaces

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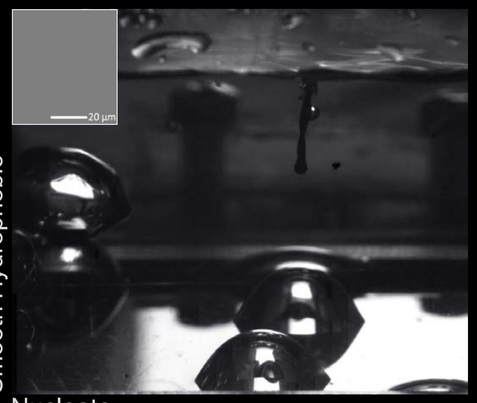
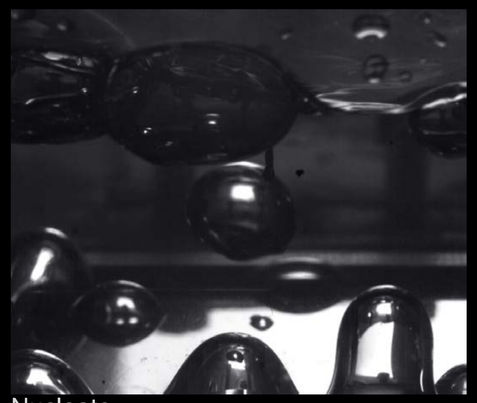
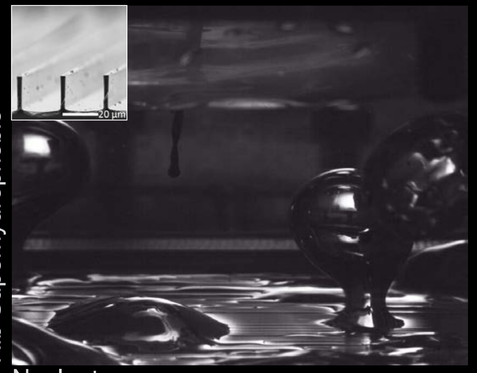
	3°C above saturation	6°C above saturation	15°C above saturation
Smooth Hydrophobic	 Nucleate	 Nucleate	 Nucleate
Rib Superhydrophobic	 Nucleate	 Transition	 Film
Post Superhydrophobic	 Transition	 Late Transition	 Film

The three classical regimes of boiling are imaged for an excess temperature range (above saturation) from about 3°C to 15°C. The microstructure of the heated surface determines the temperature at which transition from nucleate to film boiling occurs (characterized by the forming of a stable vapor film below the pool). This transition on a smooth hydrophobic structure does not occur until about 30°C. The transition occurs at much lower excess temperatures for the rib structured superhydrophobic surface, and nucleate boiling on the post structured surface is completely eliminated, with transition to film boiling occurring at an excess temperature of only 3°C.