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Hydrate crystallization at oil-water interface, the effect of non-ionic surfactants LIAT ROSENFELD, KEVIN DANN, San Jose State Univ, ROSENFELD TEAM — Gas hydrates pose economic and environmental risks to the oil and gas industry when plug formation occurs in pipelines. A novel approach using interfacial rheology and visualization techniques was applied to understand cyclopentane clathrate hydrate formation in the presence of nonionic surfactant to achieve hydrate inhibition at low percent weight compared to thermodynamic inhibitors. The hydrate-inhibiting performance of various surfactants on a manually nucleated 2 μL droplet showed a morphological shift in crystallization from planar shell growth to conical growth. Monitoring the internal pressure of the water droplet undergoing hydrate crystallization provides information on the change of interfacial tension during crystallization process. At low surfactant concentrations, planar hydrate crystal was formed and decreasing interfacial tension was observed. At high surfactant concentration, crystal morphology was shifted to conical. Interfacial tension measurements reveal oscillations of interfacial tension during the crystallization process. The oscillatory behavior of the interfacial tension is a result of the growth and release of the hydrate cones from the surface of the droplet.

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