

Research article

Lateral growth of xenon hydrate films on mica

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Supplementary

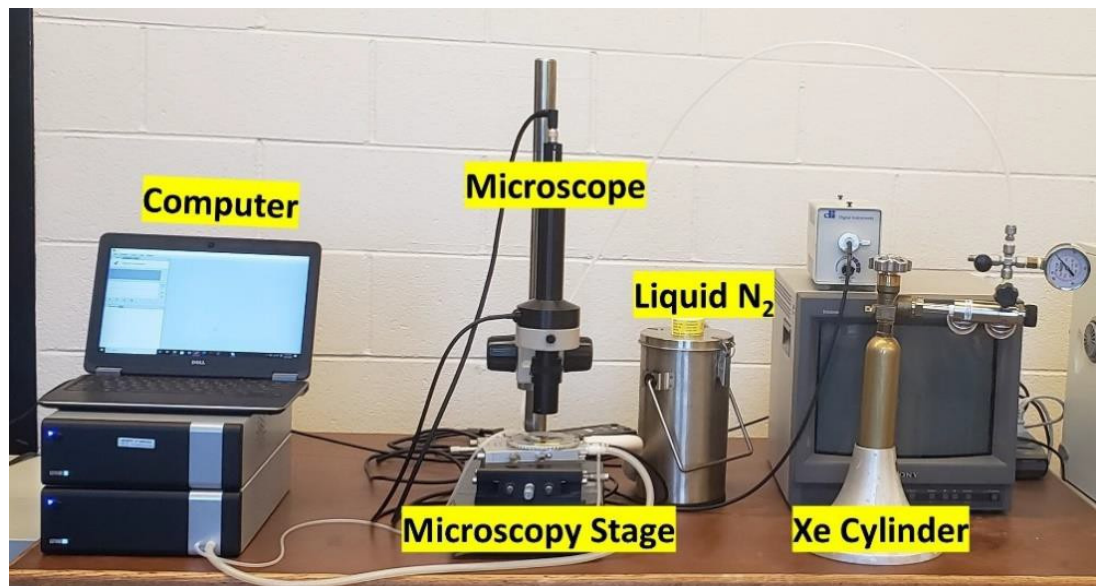


Figure S1. Photo of the experimental setup used for studying the formation of xenon (Xe) hydrate films.

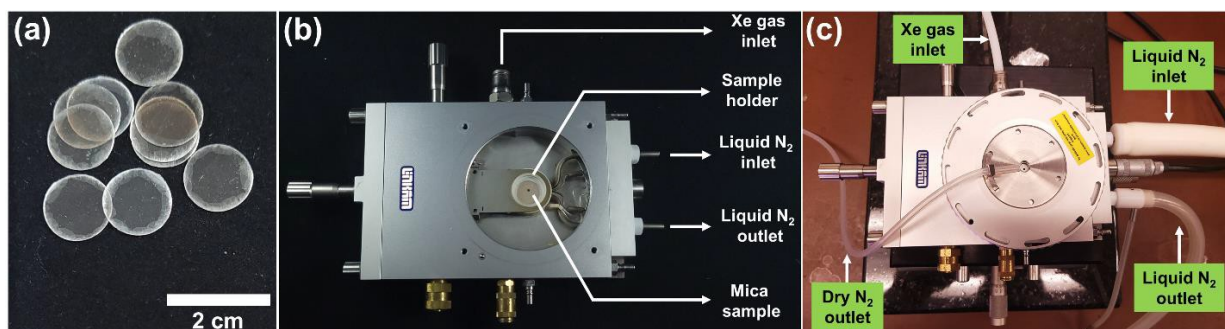


Figure S2. (a) Photo of circular mica substrates used for the Xe hydrate film growth experiments. (b) Top view of the Link THMS600-PS temperature-controlled microscopy stage used as a “mini reactor” for growing Xe hydrate films. Arrows show the locations of the sample and the crucible for holding the mica, the inlet and the outlet of N₂ gas flow from the evaporated liquid nitrogen and the inlet of the Xe gas. (c) Top view of the Linkam microscopy stage with lid closed. A proprietary software LINK was used to control the temperature of the Linkam microscopy stage.

Table S1. Table showing the chemical composition of the ruby muscovite mica (KAl₃Si₃O₁₀(OH)₂) substrate used in this study (Data provided by the supplier, Ted Pella, Inc.).

| Chemical composition of ruby muscovite mica | |
|--|--------|
| Silica (SiO ₂) | 45.57% |
| Alumina (Al ₂ O ₃) | 33.10% |
| Potassium oxide (K ₂ O) | 9.87% |
| Ferric oxide (Fe ₂ O ₃) | 2.48% |
| Sodium oxide (Na ₂ O) | 0.62% |
| Titanium oxide (TiO ₂) | Traces |
| Calcium oxide (CaO) | 0.21% |
| Magnesia (MgO) | 0.38% |
| Moisture at 10 °C | 0.25% |
| Phosphorus (P) | 0.03% |
| Sulphur (S) | 0.01% |
| Graphite carbon (C) | 0.44% |
| Loss on Ignition (H ₂ O) | 2.74% |

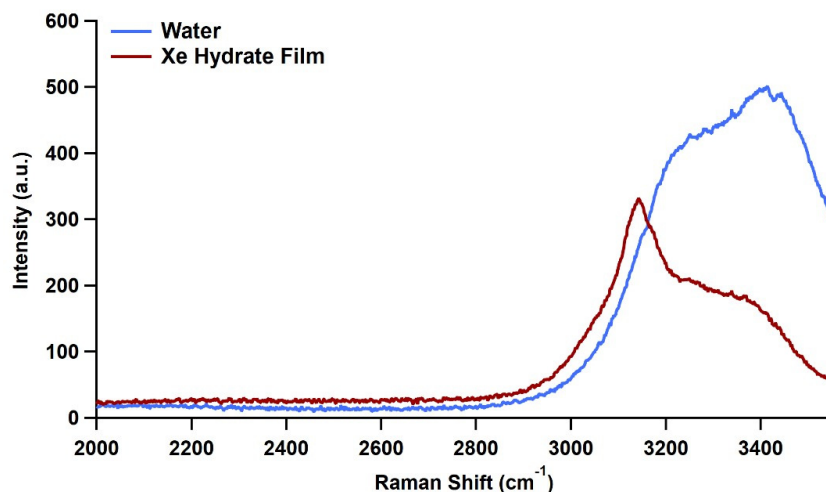


Figure S3. Typical confocal Raman spectra of a water (blue) film and a Xe hydrate (red) film on a mica surface. The spectral data shows that these two films have different characteristics –OH stretching regions. Note that in our repeated film growth experiments such as the ones shown in Figure 3, the Raman data confirms that the clear areas are water films whereas the grey areas are Xe hydrate films. The Raman data was acquired using the OMNIC software from the manufacturer.

Video SV1. Video showing the lateral growth of a xenon hydrate film on mica at $-10\text{ }^{\circ}\text{C}$ under 2.75 bar of Xe (3 s long). The video was recorded using Hauppauge WinTV software. The name of the video file is matersci-08-05-047-s02.

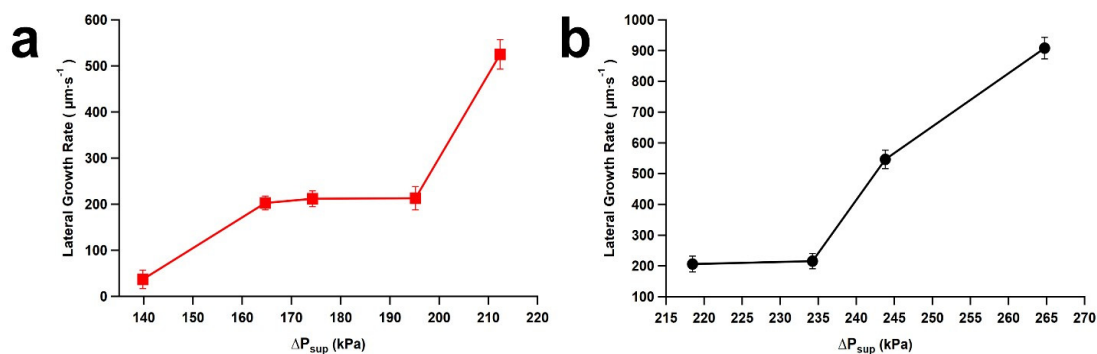


Figure S4. Plots of lateral growth rates of Xe hydrate films vs. superpressure (ΔP_{sup}) under (a) $P_{exp} = 2.75$ bar and (b) $P_{exp} = 3.45$ bar of Xe. Each error bar indicates one standard deviation of the measurements.



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