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Evaporation dynamics of femtoliter water capillary bridges KUN CHO, IN GYU HWANG, YESEUL KIM, SU JIN LIM, School of Advanced Materials Science and Engineering, Sungkyunkwan University, JUN LIM, Beamline Division, Pohang Light Source, JOON HEON KIM, Advanced Photonics Research Institute (APRI), Gwangju Institute of Science and Technology (GIST), BOPIL GIM, Department of Bio and Brain Engineering, Korea Advanced Institute of Science and Technology (KAIST), JUNG GU KIM, BYUNG MOOK WEON, School of Advanced Materials Science and Engineering, Sungkyunkwan University — Capillary bridges are usually formed by a small liquid volume in confined space between two solid surfaces and particularly they have lower internal pressure than 1 atm at femtoliter scales. Femtoliter capillary bridges exhibit rapid evaporation rates. To quantify detailed evaporation kinetics of femtoliter bridges, we present a feasible protocol to directly visualize femtoliter water bridges that evaporate in still air between a microsphere and a flat substrate by utilizing transmission X-ray microscopy. Precise measurements of evaporation kinetics for water bridges indicate that lower water pressure than 1 atm can significantly decelerate evaporation by suppression of vapor diffusion. This finding would provide a consensus to understand evaporation of ultrasmall capillary bridges.

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