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***In Situ* TEM of Conductive Bridge Formation in Nanoscale Resistive Memory Devices**[1] WILLIAM A. HUBBARD, EDWARD R. WHITE, JARED LODICO, B.C. REGAN, UCLA Department of Physics and Astronomy, FAME — We observe formation and dissolution of conductive filaments in nanoscale conductive bridge memory (CBRAM) devices *in situ* by scanning and conventional TEM. Horizontally separated CBRAM devices are fabricated on electron-transparent membranes, and the solid electrolyte layer is deposited between the inactive and active metal layers via atomic layer deposition. An additional ALD film caps the entire device. This geometry allows for unambiguous determination of active filaments and precludes filament formation by surface migration of the active metal, ensuring that conductive paths form within the solid electrolyte. In this study the inactive metal, active metal, and solid electrolyte are platinum, copper or silver, and alumina, respectively. Devices exhibit repeatable switching between high and low resistance states and the impact of filament number, size, and geometry on device switching parameters is discussed.

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