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Mechanism for writing and erasing nanostructures at the $LaAlO_3/SrTiO_3$ interface using vacuum AFM[1] FENG BI, JEREMY LEVY, DANIELA F. BOGORIN, University of Pittsburgh — Nanoscale control of the metal-insulator transition in $LaAlO_3/SrTiO_3$ heterostructure can be achieved using local voltages applied by a conducting AFM probe. One proposed mechanism for the writing process (C.S. Hellberg, unpublished) involves adsorbed H_2O which dissociates into OH^- and H^+ which are then selectively removed by a biased AFM probe. To test this mechanism, writing and erasing experiments are performed in a vacuum AFM (2×10^{-5} Torr) using various gas mixtures. We find that it is not possible to write nanostructures in vacuum or in the presence of several gas mixtures that do not contain H_2O.

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