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Lithium Ion Microscope Based on a Magneto-Optical Trap B. KNUFFMAN, A.V. STEELE, Center for Nanoscale Science and Technology, NIST, M. MAAZOUZ, J. ORLOFF, FEI Company, J.J. MCCLELLAND, Center for Nanoscale Science and Technology, NIST — Focused ion beams (FIBs) are an invaluable tool for the creation and characterization of materials with nanoscale feature sizes. Recently, significant interest has been generated by emerging ion source technologies that expand the range of elemental species (over the widely available gallium source) that can be used to form FIBs chosen to suit specific applications. We have created a lithium FIB based on magneto-optical trap ion source (MOTIS) technology. The MOTIS employs laser-cooled neutral atoms that are photoionized to create an isotopically pure beam of ions appropriate for focusing to a nanoscale probe using conventional ion optics. We have achieved a focal spot size of less than 30 nm at a low 2 keV beam energy and expect sub-10 nm performance at typical FIB operating energies near 30 keV. We will present high resolution images obtained by scanning the focused lithium beam on a sample and collecting secondary electrons emitted from the surface.

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