FIB SEM Workshop 2013

Focused Ion Beam Milling of Nano Scale Probes for Scanned Probe Microscopy

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Scanned Probe Microscopy (SPM) encompasses a group of techniques which utilize a micro to nano scale-sized probe to raster scan a surface and obtain topographic, faradaic, or ion current images. Image resolution for SPM techniques is dependent, in part, upon probe size. As probe dimensions decrease, image resolution increases. A challenge is probe fabrication at small scales, especially when probes have been modified for use beyond conventional applications. Electrodes for scanning electrochemical microscopy (SECM), cantilevers for atomic force microscopy (AFM), and nanopipettes for scanning ion conductance microscopy (SICM) have been modified with parylene for increased electrochemical capability. Utilization of a focused ion beam (FIB) provides an alternative method for quick, reproducible modification of parylene modified electrodes, cantilevers, and nanopipettes with unprecedented dimensions.