

## **A Brief Review of the Current Technologies Used for the Fabrication of Metal-Molecule-Metal Junction Electrodes**

### Abstract

Fabrication techniques for Metal-molecule-metal junction electrodes suitable to study electron tunneling through metal junctions are reviewed. The applications of current technologies such as mechanical break junction, electromigration, shadow mask lithography, focused ion beam deposition, chemical and electrochemical plating, electron-beam lithography, in fabricating vacant junction electrodes are briefly described. For biomolecular sensing applications, the size of the junction electrodes must be small enough to allow the biomolecule inserted into the junction space to connect both leads to keep the molecules in a relaxed and undistorted state. A significant advantage of using Metal-molecule-metal junction electrodes devices is that the junction can be characterized with and without the molecule in place. Any electrical artifacts introduced by the electrode fabrication process are more easily deconvoluted from the intrinsic properties of the molecule.

**Keywords:** Biomolecule, Electrochemical Deposition, Electrode, Electromigration, Focused Ion Beam (FIB), Lithography, Mechanical Break Junction, Metal-Molecule-Metal Junction