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Effect of Surface Roughness on Metallic Conductivity in the Terahertz Regime MATT KIRLEY, BENJAMIN B. YANG, JOHN H. BOOSKE, University of Wisconsin-Madison — The design of sources and components for terahertz (THz) regime radiation is influenced by dissipation losses in conducting surfaces. In this regime, however, predictive capability of surface loss is lacking. A high quality factor quasi-optical (QO) hemispherical resonator operating at 400 GHz to 650 GHz is designed and implemented for the measurement of electronic properties of conductors and low-loss dielectrics. Large area, periodic, textured gold surfaces are fabricated using nanoimprinted resist as a mold for an electroforming process. A comparison of the measured effective conductivity between the samples shows the increased resistivity of the metal due to the surface features. The regular geometry of these textures enables straightforward computational simulation and direct comparison to experiment. In addition to the nanofabricated structures, we will also present measured conductivity of samples that are lapped to different average roughness values. Computational simulation of such surfaces is less straightforward than for the patterned case. Progress in this area will be reported.

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