

Abstract Submitted
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Measurement of the DC resistance of thin film semiconductor-gas systems: comparison to the effective medium approximation¹ J. GARNER, B. CARRICO, J. SAREDY, J. TRACY, N. PATEL, University of North Florida — DC resistance measurements have been made of a thin film semiconductor (indium tin oxide) that has been exposed to various gases (acetylene, methane, and sulfur dioxide). Our motivation is to use the time-dependent resistance as a means of identifying unknown gases. Three transport models were used to compare to the measurements: a simple resistor network model, a dynamic Maxwell-Garnett theory (DMGT), and a dynamic effective medium approximation (DEMA). The latter two theories are *dynamic* because the volume fractions of the constituents of the thin film-gas composite vary with time during the gas adsorption process. The resistor network model gives the general trend of the data. This novel application of the DMGT and DEMA yield results that are nearly identical to each other and that are in good agreement with our measurements.

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