Abstract Submitted
for the TSF05 Meeting of
The American Physical Society

Interaction of Gas Molecules with Various Porous Materials Loaded in a Microwave Resonant Cavity to Sense Airborne Toxins AMAN ANAND, JAMES ROBERTS, University of North Texas, JAI DAHIYA, Southeast Missouri State University, MCDANIEL FLOYD, University of North Texas — A microwave resonant cavity in the TM_{010} mode was used as a probe to study the gas absorption in Single Walled Carbon Nanotubes and other porous material with high surface area to mass ratio. The microwave Network Analyzer was used in this investigation to study the gas absorption effects as a function frequency and pressure of the gas flown into the system. All experiments have been conducted at room temperature. Wide ranges of gases (both polar as well as non-polar) were used in this experiment for the comparison of absorption effects between various porous samples. Each experiment was repeated three times to ensure the validity of the data taken. The data were analyzed with polynomial fit plots. In the experiment, the effects of absorbed impurities on the magnetic and electric field vectors in a resonant cavity loaded with CNTs were monitored using standard perturbation techniques. This interaction is described by the equation, $Z = f_1(\mu_e, \mathbf{E})$-$f_2(\mu_m, \mathbf{H})$, where $f_1(\mu_e, \mathbf{E})$ is a function of the electric permeability μ_e and the electric field, while $f_2(\mu_m, \mathbf{H})$ is a function of the magnetic permeability μ_m and the magnetic field. Gas absorption during irradiation of the CNTs affects the load in the resonant cavity, produces the frequency shifts

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Date submitted: 09 Sep 2005 Electronic form version 1.4