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Using a Microwave Cavity to Study Select Gas-Nanomaterials Absorption/Adsorption JAMES ROBERTS, University of North Texas, JAI ANAND, Southeast Missouri State University, AMAN ANAND, University of North Texas — Complex perturbation response of gas molecules and Single Walled Carbon Nanotubes(SWCNT)loaded in microwave resonant cavity operating in TE_{011} mode is presented in this talk. A microwave network analyzer was used with the resonant frequency (9.1-9.8 GHz) to demonstrate selective adsorption response of SWCNT for CO, CO_2,$O_2$and H_2. Van der Waals' and columbic forces were studied for a specific degree of affinity by SWCNTs towards select gases. Slater's Perturbation theory, the Claussius-Mossotti and Langevin-Debye relationships were used in understanding the interaction of the gases with nanomaterials. From these results a chemical-biological sensor prototype was developed. The method proposed is to develop operational sensors to detect toxin gases for homeland security and to develop "sniffers" to detect toxin drugs.

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