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**Hydrogen Physisorption Properties of Single-Walled Carbon Nanotubes Studied by Soft-X-Ray Spectroscopy.** J. ZHONG, LBNL and BSRF, Beijing, S. BARCELO, LBNL, J.-W. CHIOU, Tamkang Univ., C. L. DONG, Ins. of Phys., Taipei, C. L. CHANG, W.-F. PONG, Tamkang Univ., Y. Y. CHEN, Ins. of Phys., Taipei, S. MAO, LBNL, Z. Y. WU, BSRF, Beijing, J.-H. GUO, LBNL — Single-walled carbon nanotubes (SWNT) for nano gas sensors becomes a subject of active research. Different mechanisms for interaction of gas and SWNTs were reported. The electrical resistance was reported to change in a semiconductor SWNT when exposed to gases. The mechanism was interpreted to be collisions between gas molecules and tube wall. The major experimental effect is transport response to inert gases. It is said that deformation from collisions can change the electronic properties of SWNTs. So far there is few study to verify the mechanism and thus further investigation is needed. We have performed soft-x-ray absorption experiment to show the in-situ interaction between SWNTs and gas molecules under ambient temperature and pressure. The gas adsorption caused changes in electronic structure of SWNTs can be recovered by evacuation of gas. The collision of gas molecules to SWNTs can be responsible to the pressure-dependent spectral change. The raising gas pressure up to 10 torr induces deformation of SWNTs thus decreases the conductance, and further increase of pressure will recover the deformation due to inner tube collisions.

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