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**Adsorption-Induced Structural Changes in Graphene Oxide Frameworks**[1] JOSEPH SCHAEPERKOETTER, HELMUT KAISER, HASKELL TAUB, CARLOS WEXLER, Univ of Missouri - Columbia — In Graphene Oxide Frameworks (GOFs), graphite oxide has been intercalated with benzene diboronic acid linker molecules to create a porous material, which has shown promise for its hydrogen storage capacity. The original model of covalent crosslinked graphene sheets[2] has recently come under question, though, due to swelling of GOFs observed in polar solvents.[3] To probe the nature of bonding between linker and graphene, we have conducted hydrogen adsorption isotherm measurements at high pressures with a gas handling system designed for *in situ* neutron scattering measurements. An extended hysteresis loop in the sub-critical nitrogen isotherm indicates a possible swelling of the material upon gas adsorption. To assess pressure induced structural changes in GOF materials we are using the two-axis neutron diffractometer at the University of Missouri Research Reactor to measure the position and intensity of the (001) Bragg peak of GOF as function of pressures up to 100 bar both at 80 K and room temperature. In addition, pair distribution functions of deuterium adsorbed on GOF have been measured at the Nanoscale-Ordered Materials Diffractometer at Oak Ridge National Laboratory, showing the presence of a liquid-like phase at 42 K. [2]·Burress, J. W. *et al.*, *Angew. Chem Int. Ed.* **49,** 8902–8904 (2010). [3]·Mercier, G. *et al. J. Phys. Chem. C* **119,** 27179–27191 (2015).

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Joe Schaeperkoetter
Univ of Missouri - Columbia

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