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Sorption Properties of Halogen Containing Graphene Oxide Frameworks. JACOB BURRESS, ELIZABETH BAKER, DONALD BETHEA, KATHERINE FRANGOS, Univ of South Alabama — Physisorption of gases has applications in gas storage (e.g. methane, hydrogen for vehicles) and gas separation (carbon dioxide from flue gas). The van der Waals force in narrow pores is strong enough to condense even supercritical gases to much higher densities. Additionally, differences in the binding energy between different gases and the sorbent surface are sufficient to for gas separations. Beyond adsorption interactions, simple steric (size, shape) effects also play a role in gas separations. One class of materials currently being investigated for numerous gas storage/separation applications is graphene oxide frameworks (GOFs). GOFs consist of layers of graphene/graphene oxide separated by chemical linkers covalently bonded on both sides. This presentation will give results from boronic acid-based GOFs that contain halogen group elements. Effects of different linkers on pore shape will be presented. Physical behavior of the gases investigated (hydrogen, methane, carbon dioxide, nitrogen), including binding energies and steric effects for gas separation will also be presented. The physics mechanism behind pore breathing (expansion and contraction of pore volume) in these materials will be discussed.

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