

Reference Isotherms using Reference Materials

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Adsorbent materials have many applications, including those related to gas storage, gas purification, catalytic reforming, and sustainable development. Despite major progress in adsorption technology and physical adsorption characterization during the past two decades, measurement challenges still exist. For example, protocols for measuring high-pressure gas adsorption isotherms on well-characterized porous materials have not been standardized. To address these measurement needs, the Facility for Adsorbent Characterization and Testing (“FACT Lab”) at the National Institute of Standards and Technology has undertaken a series of interlaboratory studies to measure and quantify adsorption isotherms using reference materials. Reference isotherms of carbon dioxide adsorption on ZSM-5 zeolite (NIST Reference Material™ 8852) have been determined, including as a function of temperature, to 4.5 MPa [1], [2]. Additionally, a reference isotherm for methane adsorption on zeolite γ (NIST Reference Material™ 8850) has been determined, to 7.5 MPa [3]. Simple, empirical functions describing these isotherms were derived, and various physical properties of these zeolites have been studied [4]. More recently, isotherms for water adsorption on a nanoporous carbon (BAM Certified Reference Material P109) have been determined to 95% relative humidity and for neat water [5].

References:

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