VAMAS

# Solid Sorbents
Technical Work Area 39

Project 1

## Measuring $CH_4$ Adsorption Isotherms on Zeolite

### Objectives

The objectives of this round-robin study are to perform a high-pressure, interlaboratory comparison of methane/zeolite Y adsorption isotherms and to extract high-pressure adsorption reference data for the methane/zeolite Y system at 298 K from these isotherms.

### Background

Adsorbents are candidate materials for many commercial and industrial applications including :

- carbon capture
- catalysis
- environmental remediation
- natural gas purification
- hydrogen and natural gas fuel storage.

Although new and improved adsorbents continue to emerge for the various applications, the pace of innovation is hindered by the lack of robust methods to characterize gas sorption behaviour of materials at high pressures. Therefore, good reproducibility of high pressure gas sorption measurements is difficult to attain.

### Standardization Needs

There are currently no standards for high pressure adsorption isotherm data. The ISO TC24/SC4 committee has published standards for surface area determination as well as pore size/pore volume characterization of an adsorbent by physical adsorption. The standards are of high relevance for solid sorbents. It is hoped that work done under the current study could complement ISOTC24/SC4 standardisation efforts on solid sorbent materials.

### Work Programme

NIST Reference Material RM 8852 (synthetic ammonium ZSM-5) and carbon dioxide will be used for the proficiency test. The adsorbent for the current study will be the NIST reference material RM 8850 (zeolite Y, a synthetic sodium faujasite). The study will measure uptake of methane. The truly microporous nature of RM 8850 will enable validation of the generated reference data with expected value, and methane was chosen for the general interest in methane storage on porous materials.

The Report of Investigation for RM 8850 and RM 8852 and a peer-reviewed paper describing the production and analysis process for these materials will be sent along with the samples.

### Deliverables and Dissemination

The resulting methods and data will be made available at a NIST website and published in a peer-reviewed journal.

### Funding

Participants fund their own involvement in the project.

## Call for Participation

### Status

Samples for the interlaboratory study will be despatched before the end of 2017. Participants will be expected to report results by June 2018.

**For more information on participation:**

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