with accuracy. Besides just determining surface area by application of the well known Brunauer-Emmett-Teller (BET) model to gas adsorption isotherms, additional information (e.g., porosity and surface energy due to heterogeneity) pertaining to surface properties can be obtained. Density functional theory can be applied to calculate the surface heterogeneity in energy of low surface area or non-porous materials, which are common in pharmaceutical materials. The relevance of surface heterogeneity is likely only in monitoring relative changes from lot-to-lot and differences between crystal and amorphous forms. In this example, a study was carried out to determine the cause for the batch-to-batch variation in flowability of a Metformin HCl drug substance during processing, despite no apparent differences in physical or chemical properties. On investigating available batches, it was noticed that time between synthesis of drug substance and use in drug product manufacture (age) could be a factor. The surface energy estimated by density functional theory (DFT) showed that the freshly manufactured batch has a higher energy than the thermodynamically stable batch. The surface energy values indicate that the freshly manufactured material has more active surface, making it interact better with other surfaces as an activated powder, thus showing poor flowability.

Predicting the effect of accelerated stability conditions on the intact tablets

Using the ASAP 2020 water sorption accessory, one can easily study the effect of accelerated stability conditions such as 25 °C/60RH or 40 °C/75RH on intact tablets by carrying out the isotherms at these temperatures. The capping effect on the coated tablets or variations in rate of dissolution rates can be studied well in advance. In this example, the increase in water uptake at higher temperature resulted in lowering the Tg (glass transition) of the drug substance and gelling occurred in the dissolution media, thus drastically lowering the dissolution rates.

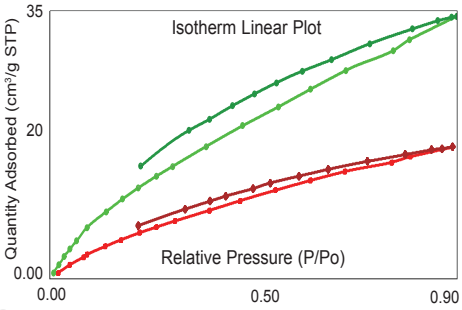

Figure 2: Water sorption isotherms for intact tablets at 25 °C and 40 °C

(1) "Application of surface area measurement for identifying the source of batch-to-batch variation in processability," Radha R. Vippagunta, Changkang Pan, Ronak Vakil, Vindhya Meda, Richard Vivilecchia, and Michael Motto; *Pharmaceutical Development and Technology*, 1097-9867, first published on 25 February 2009.

Micromeritics Announces Instrument Grant to the Department of Chemical and Biomolecular Engineering at Rice University

Micromeritics' Grant Selection Committee has selected the recipient of its grant award for the fourth quarter of 2009. An AutoChem II Catalyst Characterization System has been awarded to the Department of Chemical and Biomolecular Engineering at Rice University, Houston, TX.

According to Dr. Michael Wong, Principal Investigator and Associate Professor of Chemical and Biomolecular Engineering at Rice University, "My laboratory works at the interface of Chemical Engineering, Chemistry, and Materials Science, with a focus on designing functional nanoparticle-based materials for catalytic, encapsulation/delivery, and energy applications. The materials of interest that will be studied with the AutoChem II include specially synthesized supported metal oxide nanoclusters for heterogeneous gas-phase catalysis, bimetallic catalysts for liquid-phase chemical reactions, and carbon nanotube-based structures and metal-organic framework/coordination polymer materials for gas adsorption. Projects include the synthesis and characterization of novel metal oxide supported material with enhanced acidic properties, Pd/Au nanoparticles for water remediation applications, catalytic oxidation of carbon monoxide by gold nanoparticles, and many others."

According to Preston Hendrix, president of Micromeritics, "This program is designed to promote and advance the acquisition and use of particle characterization instrumentation in non-profit universities and institutions where other means of funding are not generally available. We are very proud and excited to present this award in an ongoing grant program to support important research." Mr. Hendrix has appointed a special Grant Selection Committee to ensure the success and effectiveness of this program.

Micromeritics' Instrument Grant Program is intended to provide particle characterization instruments to non-profit universities and research organizations for the purpose of fostering and supporting meritorious research projects. A maximum of one instrument/integrated system will be awarded per calendar quarter. The next grant decision will be made prior to 03/31/10. The next application deadline is also 03/31/10 for a 06/30/10 grant decision.

Applications may be submitted at any time in accordance with the application instructions and will remain active for a period of one year from the date of submission. Visit Micromeritics' website for a detailed grant description, application requirements, and application.