A Simple technique for surface area determination through super critical CO2 adsorption

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Abstrak

The measurement of specific surface area of porous materials has long been important in physical sciences and is currently growing in importance in applied and environmental science. Numerous systems have been developed for surface area measurement by gas adsorption. Commercial systems are available which can measure a wide range of absolute surface area with relative ease. However, their cost is often prohibitive. In this study, an inexpensive apparatus for surface area measurement has been set up to be used for measuring supercritical adsorption of CO2. The Ono-Kondo
Lattice model was used to represent the adsorption isotherm and to determine the surface area. The results of surface area determination using CO2 adsorption combined with OK model have been compared to the numbers obtained from nitrogen BET method. For surface area determination of zeolites and activated carbons, the new method
give reasonable agreement results (within 10% deviation) compared t
o the results obtained from nitrogen BET method. In addition, the
new method also gives more reasonable results for surface area determination of coals. As known, the nitrogen BET method gives almost zero of coals? surface area. This might due to the characteristic of the coals? structure that might be change (the pores are closed) during the cooling process in nitrogen BET method. Moreover, the new method can also be used to determine the surface area of porous materials using CO2 adsorption data at various temperatures without sacrificing their accuracy.