

R&D in adsorption and catalyst characterisation has begun to gain interest in material science. With the development of advanced carbon technology, products like activated carbon, carbon molecular sieve, carbon fuel cell and nano-carbon can be made from lignocellulosic materials; including oil palm biomass.

Activated carbon (AC) is a form of carbon that has been processed to make it extremely porous, and thus to have a very large surface area available for adsorption. The effectiveness of activated carbon is critical for its special applications such as in water purification, gas filtration, mercury removal and for nuclear treatment (control of radioactive gas phase contaminants).

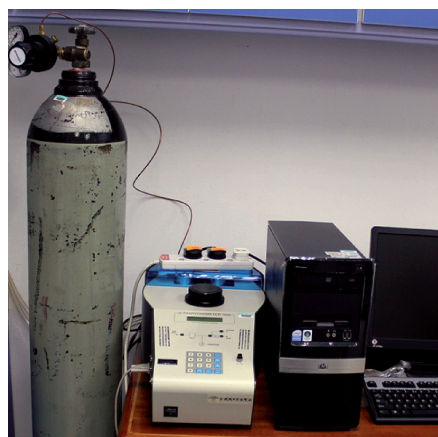
ADSORPTIONS

There are two methods of adsorption: physisorption and chemisorption. Both methods take place when the molecules in the liquid (or gaseous) phase become attached to the surface of the solid as a result of the attractive forces at the solid surface (adsorbent), overcoming the kinetic energy of the liquid contaminant (adsorbate) molecules. Physisorption occurs when, as a result of energy differences and/or electrical attractive forces (weak van der Waals forces), the adsorbate molecules become physically fastened to the adsorbent molecules. This type of adsorption is multilayered and reversible (regeneration by desorption). This is normally what happens with activated carbon. Chemisorption is when a chemical compound is produced by the reaction between the adsorbed molecule and the adsorbent, which is one molecule thick, and the process is irreversible.

DESCRIPTION OF FACILITIES

MPOB's advanced carbon testing laboratory is equipped with a pycnometer (to measure volume and true density of porous solids and powders) and a ChemBET pulsar TPR/TPD to measure BET (Brunauer Emmett Teller) surface area and to carry out catalyst characterisation of porous solids and powders. Fully automated, these equipments are programmed using the latest software.

EQUIPMENT AND TESTING



Pycnometer densitometer

- Is the ultimate gas pycnometer for measuring the true density and volume of powders, catalysts, pharmaceuticals, ceramics, carbons, building materials, rock core plugs, *etc.*
- Has a single sample station.



ChemBET pulsar TPR/TPD

- Carries out bench-top catalyst characterisation using automated flow methods of analysis.
- Determines total (BET) surface area with remarkable sensitivity. By flowing various mixtures of nitrogen and helium over the sample cooled with liquid nitrogen, the surface area can be determined from 0.1 m² upwards.

For more information, kindly contact:

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