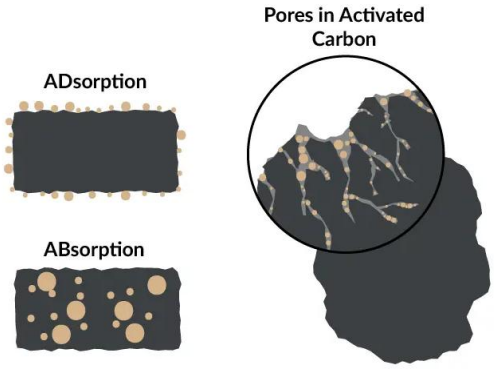
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Adsorption

Adsorption is a phenomenon occurring at the interface of gas and liquid or at the interface of liquid and solid or between immiscible liquids. This is a surface-based process where the molecules or ions bind at the surface or at the physical interface. The adsorption capacity increases with increasing molecular weight, an increase in the number of functional groups and also with an increase of polarity of the adsorbed particles.



Adsorption differs from absorption. Absorption, in turn, is associated with permeation of molecules into the interior phase and refers to the entire volume. Both processes: adsorption and absorption are known as sorption. The term sorption is used also when we are not able to determine the nature and mechanism of the process. The solid, which adsorbs molecules from the solution or the gas phase, is defined as the adsorbent, while the substance adsorbed on it - adsorbate.

Desorption is the reverse of adsorption.

An example of adsorption can be the imbibition of odors through a carbon filter in a refrigerator or imbibition of toxins through the medicinal carbon in the gastrointestinal tract. In turn, the absorption can be dissolving the gas in water, eg. carbon dioxide.

Adsorption is another chemical process that has a practical importance in medicine. Medical carbon is not absorbed from the gastrointestinal tract, but adsorbs poisons and toxins and facilitates their excretion. The larger the adsorption surface, more efficient is the process. Therefore, it is better to crush the medical carbon pill before swallowing, than sip it in its entirety.

The phenomenon of adsorption describes and quantitatively characterized by multiple mathematical equations which allows it to be used as a reproducible and reliable method in a laboratory in a wide range. The chromatographic methods used for separation of mixtures into their individual components use the adsorption phenomenon. If the adsorbate is desorbed by a solvent from a solid surface which is the column (stationary phase), the process is called eluting, and solvent alone (mobile phase) - eluent.