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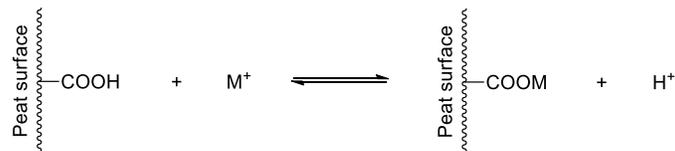
APTsorb Metal Sorption Media: Under the Surface



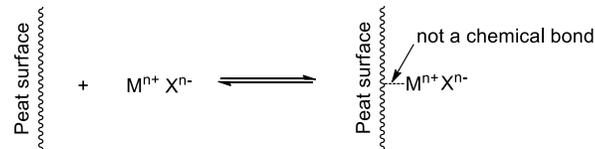
Reed-sedge peat is a complex material consisting mostly of lignin, hemicellulose, cellulose and humic substances. These constituents bear functional groups such as alcohols, aldehydes, ketones, carboxylic acids, phenolic hydroxides, esters and ethers that are primed and ready for chemical bonding. Further, it's the negative charge of these functional groups that make peat a star performer against toxins with a positive charge, including the cationic form of many heavy metals.

With such an extensive list of functional groups, it's little wonder that the mechanisms of sorption for both APTsorb and natural peat remain under debate. There are five commonly recognized mechanisms for the reaction of peat with metals:

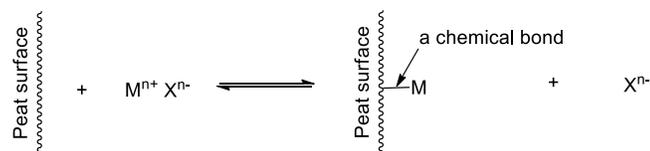
As the name implies, **ion-exchange** is simply an exchange of one ion, often a hydrogen ion on a carboxyl group, for another ion, such as a metal cation. This mechanism is often employed by traditional ion-exchange resins.



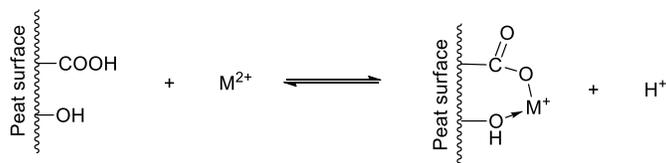
**Surface adsorption** is a weak, non-chemical attraction between the peat surface and a metal ion. This type of bond is easily reversed.



Chemisorption, or **chemical adsorption**, is a chemical bond between the surface of the peat and a metal cation. Unlike ion-exchange, there is no exchange of ions, but electrons may be shared or exchanged at the active site. Chemisorption results in a strong bond that is not easily broken.



**Complexation** is another type of chemical bond, but this time between two or more functional groups and a metal cation. The functional groups are often carboxyl and hydroxyl groups, and during the formation of the bond, the morphology of the media surface may change. A hydrogen ion may be released, depending on the functional group.



Lastly, **adsorption-complexation** is a hybrid type of mechanism, with a weak physical attraction forming between the peat surface and a metal-anion molecule while a functional group, such as a hydroxyl group, forms a chemical bond with the same molecule to balance out the charge.



### The APTsorb advantage

Natural peat has too many short-comings to be used as is. Raw peat does not have favorable hydraulic characteristics; water simply doesn't want to flow through it. Generally speaking, when raw peat is used as a water remediation media, the addition of large amounts of sand is required to maintain hydraulic conductivity in the bed. Also, raw peat is dusty, it's difficult to wet, and its low density makes shipping a challenge.

APTsorb harnesses the attractive qualities of peat while overcoming the shortfalls. APTsorb is a hardened granular media with a hydraulic conductivity of about 1 cm/sec. It is a robust media that can contend with variations in influent water. It does not require the addition of sand, which means that 100 percent of the treatment bed is dedicated to metals sequestration. It wets readily and has minimal dust.

Contact us to find out how APTsorb can help to address your heavy metal remediation concerns.

*Proven by nature...Engineered for performance*

*Unearth the power of **APTsorb***