Adsorption comparison of activated carbons for heavy metals

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Activated carbon must be chemically modified due to its lower removal efficiency of heavy metals ionic properties compared to than other organic contaminations. Surface of raw activated carbon is non-polar and adsorbate molecules non-selectively and physically, but functional groups generated by surface-modifying react with the molecules selectively through the chemical reactions of hydrogen bonding, dipole-dipole interaction, and ion exchange. Oxygen functional groups such as carboxyl, phenolic, carboxyl anhydride, lacton, carbonyl, and nitrogen groups for amide, amine, lactam, pyridine, nitrile are not only organic contaminations but also heavy metals can be adsorbed. In this study, we intend to adsorb and evaluate different types of commercial activated carbon before and after modification. To investigate the physical properties of activated carbon, specific surface areas are analyzed with SEM and BET,
and the terminal groups of surfaces ore analyzed using Fourier transform infrared spectroscopy and XPS. Zeta potential is used to investigate the formation of an electrical double layer.