

## The study of characteristics and behavior of metal ion adsorption from different bio-chars

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### Abstract

Bio-chars play an important role on the distribution of heavy metal. The adsorption process dominated the fate and transport of metals ions in the soil and groundwater environments. This study aims to analysis the characterization of four different bio-chars (ready-made rice husk ash, rice husk ash obtained from rice husk burned as a heat source and palm ash and plant ash) and to study the adsorption behaviors and sorption mechanisms of four metal ions in aqueous solution. The results demonstrate that the source and produced process are potential factors that can explain the sorption variability of bio-chars. The aliphatic and aromatic groups were all found in the four bio-chars, and the surface of bio-chars included carboxylic group, hydroxyl group and amino group. Sorption isotherms of four metal ions (copper, zinc, aluminum, and nickel) can be described by Langmuir equation. The surface properties of bio-chars controlled the adsorption mechanisms of the four metal ions in aqueous solution. The better understanding of adsorption behaviors of metal ions on bio-chars can facilitate the fate transport and risk assessment processes of metals in the environment.

Key words : bio-char, metal ions, adsorption, spectroscopic characteristics.

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