

# A Study on interaction mechanism between lignite particle interface and slime water

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**Abstract:** In order to investigate the interactions rule between lignite particle interface and coal slurry solution, impact of lignite coal particles with different stirring intensity, immersing time and different particle size on coal slurry's pH value, electrical conductivity and ion composition were studied, meanwhile, pH value, stirring intensity, immersing time, cation types and concentration impact on lignite coal particle surface Zeta potential and oxygen containing functional groups were also investigated. Results show that stirring and immersing process can gradually increase pH value of coal slurry from weakly acidic to neutral, and gradually increase solution's electrical conductivity. With decreasing particle size, suspension gets acid enhancement and its electrical conductivity increase. Zeta potential absolute value shows overall upward trend with increasing stirring intensity and pH value. Immersing process decreases first then increases lignite coal particle surface Zeta potential absolute value, and the value touch its bottom when immersing time is 3d. The order of lignite coal particle surface Zeta potential value that changed by different cation types is  $Al^{3+} > Ca^{2+} > Mg^{2+} > Na^+$ . Stirring process enlarges particle surface's carboxyl and alcohol hydroxyl group content, while decreases first then increases phenolic hydroxyl group content. Immersing process decreases first then increases carboxyl group content, while hydroxyl group content gradually increases.

**Keywords:** lignite; conductivity; pH value; Zeta potential; oxygen containing functional groups