Electrochemical Impedance Spectroscopy of Sandy Soil Containing Cl^- , SO_4^{2-} and HCO_3^-

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Based on orthogonal experiments, electrochemical impedance spectroscopy was used to study the characteristics of sandy soils containing Cl^- , SO_4^{2-} and HCO_3^- , and the universality of the equivalent circuit was also studied. The influence of Cl^- , SO_4^{2-} and HCO_3^- on the electrochemical behavior and corrosivity of sandy soil was studied by range analysis. The results show that the Nyquist diagrams of sandy soils all present capacitive reactance arcs in the high-frequency region and different diffusion slopes in the low-frequency region. The corrosiveness of No.9 sandy soil is weak, and the fitting effect of the equivalent circuit ① is the best. Regarding R_{ct} and R_s , there may be a nonnegligible interaction between the factors. HCO_3^- has a greater influence on R_{ct} , that is, the corrosiveness of sandy soil, and R_e and R_s are related to the charge storage capacity of the sandy soil. Notably, the initial electrochemical process of No.9 sandy soil is the slowest.

Keywords: orthogonal experiment, sandy soil, EIS, equivalent circuit, corrosiveness

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