

## **Residence Time Effects on P Sorption/Desorption on Ferrihydrite**

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Understanding mechanisms of P retention/release on soil mineral surfaces is fundamental in assessing the P biogeochemistry in soil/water environments. This is particularly important on Atlantic Coastal Plain sandy soils that are high ammonium oxalate extractable P, due to long-term manure amendments. Since there is a high correlation between ammonium oxalate extractable P and iron, P reaction rate on ferrihydrite was investigated through macroscopic and microscopic approaches. The effect of ionic strength (0.0, 0.1, 1.0) on P sorption was investigated over a pH range of 4-9.5. At lower pH, there was little effect of ionic strength, while at higher pH, sorption decreased as I decreased. The effect of pH (4, 7.15, 9.5) on P sorption kinetics was also studied over residence times of 5 min.-30 d. Initial sorption was rapid, however a slow sorption process continued with increased time, particularly at pH 7.5 and 9.5. This phenomenon was also observed in sorption envelope kinetics studies. Time resolved ATR-FTIR spectroscopy was coupled with the macroscopic studies to delineate P surface complexes at the molecular scale.