# NICKEL ADSORPTION BY VARIABLE CHARGE SOIL

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Nickel input in the environment has increased due to inadvertent discharge of the industrial residues and to incorrect agricultural use of fertilizers, pesticides and biosolid sources. Was used laboratory batch experiments to construct adsorption isotherms and adsorption envelopes in order to evaluate the effects of the pH and ionic strength on Ni adsorption and the directional force of the reaction in surface (0-0.2 m) and subsoil (1.0-1.3 m) samples of a Brazilian variable charge Oxisol (Anionic "Xanthic"Acrudox). Experimental results of Ni adsorption isotherms fitted the Langmuir model. Ni adsorption was related to sampling depth. Higher maximum adsorption capacity ($Ads_{max}$ = 2820 mg $kg^{-1}$) were detected in the samples from the surface horizons (0-0.2 m) and should be correlated with the organic carbon content. On the subsurface sample, $Ads_{max}$ was 760 mg $kg^{-1}$. On the other hand, Ni affinity ($K_L$) was greater in the subsoil (0.022 L $kg^{-1}$) than in the surface samples (0.003 L $kg^{-1}$). Adsorption edges (%ads *vs* pH plots) showed the sharply increase of Ni adsorption (20-90%) in the 4-6 pH range. Ni adsorption decreased with increase in the ionic strength and this effect indicated that eletrostatic adsorption was the major retention mechanism, but only in the 5-6 pH range. However, Ni adsorption was mediated by specific adsorption above pH 7, probably due the increase in the $NiOH^+$ chemical species. Ni adsorption reaction was favorable and occurred spontaneously, as indicated by the negative values of the free energy variation ($\Delta$G) and the separation factor $K_R$ <1.When compared under the standard 0.01 mol $L^{-1}$ionic strength condition, the maximum $\Delta$G values was -6680 J $mol^{-1}$ for surface sample (at pH 6.0) and -6620 J $mol^{-1}$ for subsoil (at pH 7.0).