Thermally-Induced Physicochemical Changes in Iron and Aluminium Amorphous Gels. (S02-makris103939-Poster)

Authors:

- K.C.Makris* - *University of Florida, Gainesville*
- G.A.O'Connor - *University of Florida, Gainesville*
- W.G.Harris - *University of Florida, Gainesville*
- T.A.Obreza - *University of Florida, Immokalee*

Abstract:

Amorphous Fe and Al (hydr)oxides are commonly found in soils as weathering products. Their role in transport and availability of P in soils is known, but poorly understood. The slow kinetics of oxide transformations hinder a better understanding of availability of P bound to Fe and Al oxides. The heat treatment of amorphous Fe and Al oxides could mimic and accelerate long-term weathering reactions that usually take decades to occur naturally. Our study objectives were firstly to determine the effect of 70 C heat treatment during 8-month incubation on the physicochemical properties of amorphous Fe and Al hydroxides with and without co-precipitated P (P to metal molar ratio of 1:1), and secondly to monitor the sorbed P behavior as the oxides transform to more crystalline phases. Aliquots were drawn periodically and analyzed for oxalate-extractable P, Fe, and Al. We used surface area and x-ray diffraction (XRD) analyses to follow the aging process of metal oxides. Initial results showed incipient crystallization from the gel stage of the amorphous hydroxides, based on broad XRD peaks and reduction in surface area. The addition of P increased macroporosity of the Fe and Al oxides, as indicated by the N2-BET isotherms. In both Fe and Al oxides, P addition retarded oxide

crystallization. Decreases in oxalate-extractable Al paralleled incipient broad XRD peaks. Absence of peaks similar to Al-XRD for Fe-oxides was confirmed by the oxalate-extractable Fe concentrations that remained constant after 6 weeks of incubation.

Corresponding Author Information:

Konstantinos Makris
University of Florida, Gainesville
716-104 SW 16th Ave
Gainesville, FL 32601

phone: 352 3362169
e-mail: kcmakris@ufl.edu

Presentation Information:

Presentation Date: Tuesday, November 12, 2002
Presentation Time: 9:00-11:00 am
Poster Board Number: 2036

Keywords:

amorphous iron and aluminium, phosphorus, crystallinity, thermal treatment