

# GEOC: Division of Geochemistry

## 49 - Properties and reactivity of Fe-organic matter associations

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**Abstract:** Organic matter (OM) is well known to strongly associate with Fe-oxides in soils and Fe-C redox cycling is important in soil C sequestration. This study compared the properties of OM-Fe complexes formed from adsorption (reaction of OM to post-synthesis ferrihydrite) *versus* coprecipitation (formation of Fe solids in presence of OM) in oxic conditions. Coprecipitates and adsorption complexes were synthesized using dissolved organic matter extracts from a forest litter layer at varying molar C/Fe ratios of 0.3-25.0. Sample properties were studied by N<sub>2</sub> gas adsorption, XRD, FTIR, Fe EXAFS, Mössbauer, and STXM-NEXAFS techniques. In a reducing environment, Fe<sup>2+</sup> (aq) can catalyze Fe-oxides to recrystallize into new mineral phases. This Fe<sup>2+</sup>-catalyzed recrystallization is an unexplored pathway for C mobilization or sequestration. Therefore this study quantified the extent of Fe<sup>2+</sup>-catalyzed recrystallization in Fe-OM coprecipitates and assessed the C availability following recrystallization of the Fe-OM coprecipitates. These results will provide new insights into how redox fluctuations impact the behavior of Fe and C in soils and sediments.