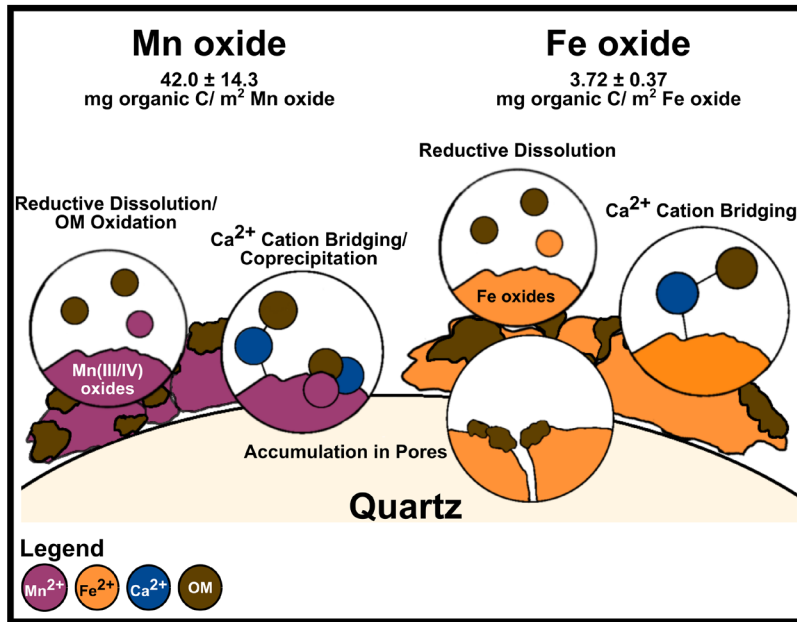


Manganese Oxide Holds More Organic Matter in Forest Soil



The quantity of organic matter that associated with manganese (Mn) and iron (Fe) oxides buried in acidic forest soil for one year and the proposed mechanisms influencing these organo-mineral associations.

K. Bidas, H. Li, F. Santos, E. C. Rooney, B. Reinhart, L. He, C. Do, Q. Zhao, R. Tapper, and E. Herndon. "Manganese Oxides Incubated in Acidic Forest Soil Retain More Organic Carbon Than Iron Oxides." *Environmental Science & Technology* 36: 25578-25589 (2026).
<https://doi.org/10.1021/acs.est.6c07327>

Scientific Achievement

Scientists discover that manganese (Mn) oxide is much more effective at holding onto organic carbon than iron (Fe) oxide in acidic soil.

Significance and Impact

Understanding this balance could improve scientists' understanding of how carbon is stored and cycled through forest ecosystem.

Research Details

- Fe and Mn oxides were buried in mesh bags under acidic forest soil to evaluate the organic matter that associated with them over time.
- Interactions between organic matter and Mn oxides were facilitated by calcium (Ca) ions that served as a positive bridge between the two negatively charged species.
- At NSLS-II, Ca K-edge XANES at the XFM beamline helped determine how Ca was associated with the mineral-coated sands and Bulk Mn and Fe K-edge XANES measurements at the BMM beamline helped the team examine the oxidation states of Mn and Fe.

