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Understanding the Internal Structure of Layered Organic Compounds deposited on mineral surface using Neutron Reflectivity¹ HAILE AMBAYE, SNS, ORNL, Oak Ridge, SINDHU JAGADAMMA, LOUKAS PETRIDIS, MELANIE MAYES, Energy and Environmental Sciences Directorate, ORNL, Oak Ridge, VALERIA LAUTER, SNS, ORNL, Oak Ridge — Organic carbon (OC) stabilization in soils plays a significant role in the global C cycle, therefore the understanding of the structure and function of the OC-soil mineral interface is of high importance. To study the internal structure, films with different combination of simple OC compounds, natural organic matter (NOM), Bi-layers of SA (Stearic Acid) on Glucose and NOM/Hydrophilic-NOM/Hydrophobic-NOM were deposited onto sapphire using spin coating. The phobic and phylic fractions of the NOM are operationally separated by exchange resins. We obtained detailed structural depth profile of the films using the depth-sensitive technique of the neutron reflectometry. The neutron reflectivity data were collected at the MAGICS Reflectometer at Spallation Neutron Source at the ORNL. Self-assembled ordering of SA in a repeating bi-layer structure was observed when it was deposited on NOM, phylic-NOM and Glucose. However, when SA was added to phobic-NOM no ordering of SA was detected. The formation of distinct, immiscible layers is due to insolubility of SA with NOM/Hydrophilic-NOM and Glucose. Our results reveal that the OC-mineral interface form complex layering and that the sequence of the layering depends on the compounds.

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