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Neutron Reflectometry from Biological Thin Films at the NIST Center for Neutron Research: Past, Present and Future. S. Krueger, NIST Center for Neutron Research, NIST, Gaithersburg, MD USA.

During the past decade, neutron reflectometry has increasingly become an important technique for the characterization of supported planar biological and biomimetic thin films. Advancements in instrumentation, sample environment and measurement protocols now make it possible to obtain Angstrom-level information about the composition of these materials along the axis perpendicular to the plane of the membrane. A newly developed phase-sensitive neutron reflectometry technique now allows direct inversion of the reflectivity data to obtain unique compositional depth profiles of the films. The development of these neutron reflectometry methods at the NIST Center for Neutron Research will be reviewed and some examples pertaining to the study of peptide and protein interactions with planar bilayer model membranes will be illustrated. The use of neutron reflectometry for the study of systems of importance for biomedical and bioengineering applications will also be examined. Examples of the characterization of such systems using the phase-sensitive neutron reflectometry technique will be presented. Finally, future experiments will be discussed in light of advances in both experiment and computational techniques.