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X-ray reflectivity study to investigate the nanoscale structure of atmospheric plasma polymerized films[1] BRENNA ROSSI, CAGATAY YILMAZOGLU, MARK D. FOSTER, University of Akron — Atmospheric plasma polymerized (APP) films' deposition, physical properties, and chemical composition have been well-studied due to interest regarding their versatility. However, the nanoscale structure of APP films has never been thoroughly probed with respect to depth. We report X-ray reflectivity curves of atmospheric plasma polymers (APP) deposited from hexamethyldisiloxane (HMDSO) at varying plasma power levels and levels of relative humidity. The reflectivity datasets were all well-fitted with 3-layer models featuring a thick, higher scattering length density (SLD) "bulk" layer between two thinner, lower SLD layers at the substrate and air interfaces. For films deposited at low humidity, the SLD of the bulk layer decreases with increased power level applied to the plasma during deposition, but increased humidity curtails this sensitivity to power. The bulk layer SLDs are the same across power levels at higher humidity.

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