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**Tribological Properties of Atmospheric Pressure Plasma Polymerized Silica-like Films** BING HAN, JAMES BOERIO, University of Cincinnati — Thin silica-like films were deposited on ferrotype plate and polycarbonate (PC) substrates with an atmospheric pressure plasma jet using hexamethyldisiloxane (HMDSO) as the precursor. It was found that the thickness and properties of the film were sensitive to the flow rate of the precursor, the deposition distance, and the radio frequency power. Residual methyl groups were incorporated into the film when the distance between the nozzle of the plasma jet and the substrate was increased, or when the RF power used in deposition was decreased. This was confirmed by an increase in Si-CH<sub>3</sub> peak intensity in the Fourier transform infrared spectroscopy spectra of the films. The atomic compositions and chemical bonding of HMDSO-air plasma-polymerized SiO<sub>x</sub>C<sub>y</sub> were analyzed by X-ray photoelectron spectroscopy. Low precursor flow rates produced smoother, more continuous, and more uniform films than high precursor flow rates. Low precursor flow rates produced films with atomic composition of Si:O:C=1:2.37:0.2. The deposited films presented mainly inorganic characteristics without adding oxygen or argon gas to the ionization gas mixture, as is common in the literature. Scratch resistance of the films was measured using a scratch tester with a diamond indenter under progressive load. Post scratch image and surface morphology of the substrate and the film was obtained by scanning electron microscopy and atomic force microscopy.

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