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The abstract reported below is taken by "**Probing the Impact of Tribolayers on Enhanced Wear Resistance Behavior of Carbon-Rich Molybdenum-Based Coatings**"

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Abstract

Minimizing friction and wear is one of the continuing challenges in many mechanical industries. Recent research efforts have been focused on accelerating the antifriction and antiwear properties of hard coatings through the incorporation of self-lubricant materials or the development of new architectures. In this present study, carbon-rich MoC, MoCN, and multilayer MoC/MoCN coatings were deposited using reactive magnetron sputtering. X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS), and Raman spectroscopy were used to evaluate their properties, which revealed the presence of ceramic cubic crystallites, covalent bonds between primary elements, and an excess of amorphous carbon (a-C) in all of the coatings. The multilayer architecture and possible segregation of a-C around the ceramic crystallites resulted in improved mechanical properties for all coatings, with MoC/MoCN coatings having a maximum hardness of 21 GPa and elastic modulus of 236 GPa. Friction and wear behavior are initially determined by the structural–composition–property relationships of the respective coatings; later, the tribological characteristics are altered depending on the nature of tribolayer on both mating surfaces at the contact interface. The highest wear resistance of multilayer MoC/MoCN coating (8.7×10^{-8} mm^3/N m) and MoC coating (3.9×10^{-7} mm^3/N m) was due to the dissipation of contact stress by the tribofilm consisting of carbon tribo products like graphitic sp^2 carbon, diamond-like sp^3 carbon, and pyrrolic-N. On the other

hand, MoCN coating depicted a lower wear resistance due to the frequent termination of C–H bonds by N, which restricts the strong formation of tribofilms as well as poor mechanical properties.