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Formation of Interfacial Carbide Layers in Multilayer Ti/DLC Thin Films JASEN SCARAMAZZA, ZACHARY BUCK, TYLER DONATO, BRITTANY CURRAN, C.A. LUNK, S.E. LOFLAND, J.D. HETTINGER, Department of Physics and Astronomy, Rowan University — Titanium (Ti)/Diamond-like-carbon (DLC) and Chromium (Cr)/Carbon (C) multilayer films were prepared on c-axis oriented single crystal sapphire (Al_2O_3) substrates using magnetron sputtering. Interfacial properties of the films were analyzed using x-ray reflectivity and scanning electron microscopy. When DLC is sputtered on a layer of Ti, an interfacial layer of titanium carbide (TiC) forms which is reported for the first time. Energy provided by the substrate bias necessary to facilitate DLC sp3 bond formation is suspected of allowing TiC to synthesize in a thin layer before DLC forms. It was also found that DLC has difficulty forming on Cr. These results are relevant to biomedical applications where DLC is applied as a low friction/wear film that can be formed on the surface of implants composed mainly of titanium. Further investigation into the medical and tribological effects of TiC interfacial layers is suggested.

[X] Prefer Oral Session
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