Modeling Water's Role in the Initial Friction Behavior of MoS$_2$ Films

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ABSTRACT

The transition to steady state, or run-in, for solid lubricants is a relatively unexplored and poorly understood aspect of performance. More importantly, for many precision components such as those used in mechanisms for aerospace applications, duty cycles frequently limit all operation to the run-in phase. This talk focuses on factors that contribute to increased friction during run-in, with a focus on the role of water in the contact and in the bulk of the film over time. Friction experiments were carried out in environments from ambient conditions to UHV over a wide range of dwell times. A mechanism for water's role is discussed and a generalized model is presented to help predict aging effects of water on run-in behaviors for MoS$_2$ films.

Biography

John Curry obtained his Ph.D. at Lehigh University under Dr. Brandon Krick in August 2017 and is now a postdoctoral appointee at Sandia National Laboratories. His research focuses on understanding how microstructure of solid lubricants and metals is affected by environment and other factors, and what that means for resulting tribological behaviors.

Keywords: MoS$_2$, DLC, environment, run-in, friction