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Layered atomic structures of silver vanadate compounds for low shear strength at high temperatures A. ABUNADA, S. AOUADI, Q. GE, M. TSIGE, Southern Illinois University -Carbondale — The aerospace industry has been a strong driving force for the creation of new and effective wear-resistant and lubricious materials at high temperatures (T $>$ 500 $^\circ$C). Solid lubricants (SLs) such as graphite and molybdenum disulfide oxidize and, hence, degrade rapidly at T $>$ 350 $^\circ$C. The selection of oxides is a clear viable alternative for the choice of SLs when confronting the problem of oxidation. Double metal oxides of the form $Me_xTM_yO_z$, where Me is a noble metal and TM a transition metal, were found to exhibit relatively low coefficients of friction in the 500 to 700 $^\circ$C range (μ = 0.1-0.3) . Very recently, our group has undertaken to understand the friction properties of a silver vanadate, which was shown to be an effective lubricant up to 1000 $^\circ$C. We show, using *ab-initio* calculations within the density functional theory framework, that the layered atomic structure of silver vanadate with weak inter-planar bonds that facilitate sliding, resulted in a low coefficient of friction.

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