

Temperature Dependent Tribological Properties of Graphite

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Abstract : Temperature dependent tribological properties of nuclear grade turbostratic graphite were studied using 100Cr6 steel counterbody. High value of friction coefficient (0.25) and high wear loss was observed at room temperature and this value decreased to 0.1 at 150°C. Consequently, wear loss is also decreased. Such behavior is explained by oxidation/vaporization of graphite and water molecules. At room temperature, the adsorbed water in graphite does not decompose and effect of passivation mechanism does not work. However, at 150°C, the water decomposed into OH, atomic hydrogen and oxygen which efficiently passivates the carbon dangling bonds. This effect is known to decrease the energy of the contact and protect against abrasive wear.

Keywords : high temperature tribology, oxidation, turbostratic graphite, wear

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