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EFFECT OF ELECTRICAL CURRENT ON FRICTION AND WEAR BEHAVIOR OF COPPER AGAINST GRAPHITE FOR LOW SLIDING SPEEDS

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Abstract: Copper-graphite is an important tribological material used in the applications of electrical sliding contact like generators and electrical brushes. A series of experimental tests were conducted on a pin-disc tribometer in air and dry sliding condition. The pair of material was subjected to electric current ranging from 0 to 10A, normal loads of 5 to 30N and sliding speed of 0.5m/s. The duration of each test was 30 minutes. Experimental results indicated that the friction coefficient decreases and wear rate increases with increasing load with and without applied electric current. The changes in surface chemistry and topography of the tribo-surfaces were characterized using Raman spectroscopy, scanning electron microscopy (SEM) and energy dispersive spectrometer (EDS). This later technique was used to analyze the transfer of pin materials to the counterface, and also to understand how copper and graphite influence the tribological properties. Results indicated that, electric current and normal load have more or less significant influence on the tribological behavior of the pair of materials and the effect of oxide layer created at interface of the pairs in contact.

Keywords : friction, wear, Contact temperature, load, Electric current.