## Comparative Study of Wear and Friction Behavior of Tricalcium Phosphate-Fluorapatite Bioceramic

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Abstract : In the present work, we explored the potential of tribological behavior of tricalcium phosphate-Fluorapatite ( $\beta$  Tcp-Fap) bioceramic which has attracted considerable attention for orthopedics and dental applications. The approximate representatives Fap- $\beta$ Tcp were respectively [{13.26 wt%, 86.74 wt%} {19.9 wt%, 80.1 wt%}, {26.52 wt%, 73.48 wt%}, {33.16 wt%, 66.84 wt%} and {40 wt%, 60 wt%}. The effects of Fluorapatite additives on friction and wear behavior were studied and discussed. The wear test was conducted using pion-disk tribometer at room temperature under dry condition using a constant sliding speed of 0,063 m/s, and three loads 3, 5 and 8 N. The wear rate and friction coefficient of  $\beta$  Tcp with different additive amounts were compared. An Alumina ball specimens were used as the pin and flat surface  $\beta$  Tcp-Fap specimens as the antagonist counterface. The results show a huge difference between the wear rate of  $\beta$  TCP samples and the other  $\beta$  TCP-Fap composites for all normal forces applied. This result shows the beneficial effect of fluorapatite on the tribological behavior of the  $\beta$  TCP. Moreover, we note that  $\beta$  Tcp-26% Fap specimens exhibit, under dry condition, the lower friction coefficient and the smaller wear rate than other biocomposites. Thereby, the friction and wear behavior is influenced by the addition of fluorapatite, the applied normal force, and the sliding velocity. To extend the understanding of the wear process, the surface topography of  $\beta$  Tcp-26% Fap specimens and the wear track obtained during the wear tests were studied using a surface profilometer, optical microscopy, and scanning electron microscopy.

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Keywords : alumina, bioceramic, friction and wear test, tricalcium phosphate

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