

Tribological evaluation of CoCrMo alloy for biomedical applications

Eurico Felix Pieretti¹, MAURICIO MARTINES DAS NEVES¹, Olandir Vercino
Correa², R. A. Antunes³

¹Instituto de Pesquisas Energeticas e Nucleares (CCTM) , ²Instituto de Pesquisas
Energeticas e Nucleares, ³Universidade Federal do ABC (CECS)

e-mail: efpieretti@usp.br

The tribological behavior of the CoCrMo alloy was evaluated in the air in a nanotribometer. The chemical composition, microstructure and mechanical properties of CoCrMo alloys makes them potential materials for use as implantable medical or dental devices [1]. This work has a specific focus on covering the possible *in vitro* wear modes seen on metal-on metal surfaces. Ball-cratering wear test was carried out for 10 min with a solid sphere of WC as counterbody, at a frequency of 75 rpm [2]. The CoCrMo samples' cytotoxicity was analyzed in order to determine if the alloy casting process and its surface finishing, current used in industry, affects the biomaterial's biocompatibility. All tested surfaces were prepared according to the recommendations for clinical use. The results address the potential detrimental effects of hard particles *in vivo* such as increased wear rates (debris generation), which is greatly influenced by the normal force, and corrosion (metal-ion release). None sample was considered cytotoxic.

Acknowledgements:

The authors thank CAPES for the financial support.

References:

[1] Niinomi. M., Nakai, M., Hieda, J., *Acta Biomaterialia*, 8, p. 3888-3903, (2012).

[2] Diomidis, N., Mischler, S., More, N. S., Roy, M., *Acta Biomaterialia*, 8, p. 852-859, (2012).