

STUDYING THE PROPERTIES OF COCRM0 (F75) DOPED Y USING (P-M) TECHNIQUE

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ABSTRACT

Cobalt alloys are one of the main groups of metallic materials used as implants. They are numbered among biomaterials of good biocompatibility. Their mechanical properties and corrosion resistance are determined by chemical composition and the technology of production as well.

This study aims to investigate the effect of yttrium addition (0.5, 1 and 1.5 wt %) on properties of CoCrMo alloy (F75) prepared using powder metallurgy technique. The corrosion, wear and compressive behavior were investigated using different examination and test including mechanical test (hardness, compression and wear) and electrochemical test (open circuit and potentiodynamic polarization). The results revealed that the addition of Y has a notable effect on the porosity of sintered CoCrMo causing increasing in porosity. The hardness decreases with increasing Y addition. The addition of Y decreases the compressive strength and it's decreased as addition increased. On the other hand the wear rate of CoCrMo (with and without Y addition) increases as the time and load increase, however, Y addition improve wear resistance, the improvement increased with increasing Y content. The corrosion resistance of F75 alloy was improved by Y addition in both artificial saliva and Hank's solution, the improvement increased as Y addition increased. The corrosion current density for alloys in artificial saliva is lower than that in Hank's solution.

KEYWORDS: CoCrMo alloy, F75 Alloy, Y Addition, Corrosion Resistance, Wear Resistance, Compressive Strength