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# Reduction of Corrosion Current of CoCr Alloys by Post-PIII Oxidation

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## Abstract

Nitriding of biomedical CoCr alloys at elevated temperatures leads to a marked increase in the hardness and wear resistance. However, a compromised corrosion resistance is encountered even at relatively low temperatures, not correlated with the appearance of CrN in the XRD spectra. A duplex treatment of initial nitrogen and subsequent oxygen PIII at 350 °C was already shown to reduce the corrosion current while imposing a high ion bombardment at relatively low oxygen uptake. Here, it is investigated whether oxidation in a furnace at atmospheric pressure or annealing in an ICP oxygen plasma at 1 Pa has the same effect as the oxygen PIII process. GDOES, XRD, XPS and corrosion investigations in bovine serum are performed to obtain information on the underlying mechanisms of the improved corrosion resistance, e.g. stress relaxation by annealing, high pressure/temperature phase formation by oxygen ion implantation or fast oxidation at atmospheric pressure.

**Keywords:** Plasma Immersion, oxygen implantation, Cocr alloys

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