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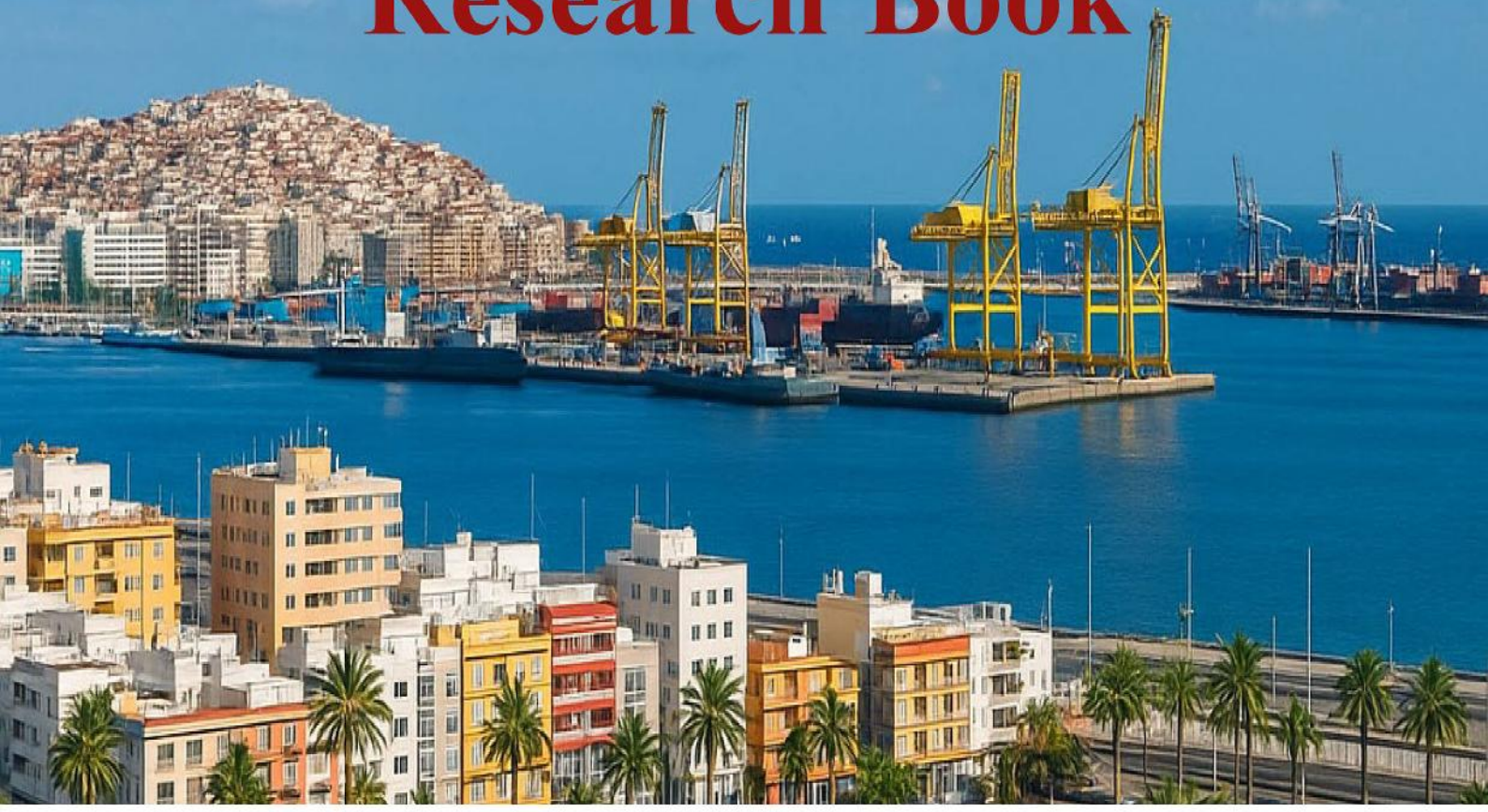

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Coordinadora: Julia Claudia Mirza Rosca

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Corrosion Behavior of Two Co-Cr Dental Alloys Fabricated by Additive Manufacturing

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ABSTRACT

Dental materials must be meticulously examined to ensure they do not inflict harm on the human body. Given the stringent requirements for biocompatibility, the dental alloys must be non-toxic and must not induce any allergic reactions or inflammation within the body. Cobalt-based alloys are some of the recommended types of metallic biomaterials. Applications are included in orthopedic implants, as well as in cardiac and dental domains. Co–Cr alloys are utilized in dentistry for porcelain-fused-to-metal (PFM) crowns owing to their biocompatibility, wear resistance, longevity, excellent mechanical qualities, and exceptional corrosion resistance [1,2]. This study evaluated and contrasted two Co–Cr based dental alloys fabricated by additive manufacturing, examining their microstructural characteristics and corrosion resistance in artificial saliva by several methodologies. The results of the investigation indicated a pronounced passivation propensity for the two alloys examined, characterized by the production of stable mixed protective layers of Cr2O3·CoO on their surfaces, significantly improving their biocompatibility in artificial saliva. The kinetic parameters of the corrosion process in the experiment revealed a two-time constant process governed by anodic control, due to the production of passive films on the surfaces. The findings of this study indicate that the polarization resistance of the two Co–Cr alloys analyzed in Ringer solution attained levels characteristic of biomaterials with significant corrosion resistance, and the passive films developed on their surfaces demonstrated satisfactory corrosion resistance.

Keywords *— Co-Cr alloys; Additive manufacturing; Corrosion; EIS*

References

[1] A. Fratila, C. Jimenez-Marcos, J.C. Mirza-Rosca, A. Saceleanu, Mechanical properties and biocompatibility of various cobalt chromium dental alloys, Mater. Chem. Phys. 304 (2023) 127867. https://doi.org/10.1016/j.matchemphys.2023.127867.

[2] C. Jiménez-Marcos, J.C. Mirza-Rosca, A. Fratila, A. Saceleanu, Influence and Comparison of the Properties of Three Cobalt-Chromium Dental Alloys, Microsc. Microanal. 29 (2023) 156-160. https://doi.org/10.1093/micmic/ozad067.071.