

Development of Nano- and Micro-Coatings

Krzysztof Rokosz 

Faculty of Electronics and Computer Science, Koszalin University of Technology, ul. Śniadeckich 2,
PL 75453 Koszalin, Poland; rokosz@tu.koszalin.pl; Tel.: +48-94-3478-354

1. Introduction and Scope

Nanolayers and microcoatings are most often used in the food industry, mechanical engineering tools, aerospace technologies, and in biomaterials. They can be fabricated on metals and alloys by ion implantation, plasma electrolytic oxidation (microarc oxidation), magneto-electropolishing, electrophoretic deposition laser treatment, as well as PVD and CVD. They have different chemical and phase composition and corrosion resistance. In addition, the mechanical properties and antimicrobial resistance are different from the matrix. In this way, they are highly attractive in the case of preparing new applications.

2. Contributions

Three research articles were published in the Special Issue of Development of Nano- and Micro-Coatings. All the presented topics are multidisciplinary, and include composite layers fabricated by vacuum deposition [1], Ce-hydroxyapatite coating [2], as well as Cu-release of a-C:H:Cu in Ringer solution [3].

In paper [1], composite thin coatings based on chitosan-coated magnesium-doped hydroxyapatite were presented. After exposure to a 6 Gy irradiation dose of the MgHApCh composite thin films, fine cracks on their surfaces were observed. In addition, after gamma irradiation, a decrease in calcium, phosphorous, and magnesium was also noticed. In the next four papers [2], antifungal Ce-doped hydroxyapatite coatings were presented. They inhibited the development and adherence of *C. albicans* fungal cells.

In reference [3], a-C:H:Cu coatings fabricated by the PVD–PECVD hybrid process and enriched with Cu²⁺ ions as bactericidal agent fabricated on Ti6Al4V were shown. It was also found that the Cu²⁺ ion release from a-C:H:Cu coatings in Ringer's solution depends on the overall amount of copper ions in the obtained coatings and that an additional top a-C:H barrier layer delays the release of Cu ions to solution.

3. Conclusions and Outlook

The topics related to the nanolayers and microcoatings in this Special Issue were shown. It should be pointed out that the presented subjects are interdisciplinary and include composite coatings fabricated by vacuum deposition, Ce-hydroxyapatite coatings, and a-C:H:Cu enriched with Cu [3].

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