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Manufacturing Method and Material Characterization of Nanocrystalline Nickel Coatings with Gradient Grain Size

*Cezary Dziekoński**

Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland

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Abstract

Nanocrystalline materials exhibit attractive mechanical properties compared to their coarse-grained counterparts. The values of these properties are mainly affected by the size of grains, so it is possible to control the properties of the material by controlling the grain size in the coating. Moreover, due to the fact that nanocrystalline coatings are often deposited on the coarse-grained substrate there is sufficient influence of the grain size in the area close to the interface. Thus, a coating that would have a variable microstructure should have better mechanical properties. Hence, the aim of the presentation is to show the results of the investigation of gradient grain sized coatings of nanocrystalline Nickel fabricated using Pulsed Reversed Current electrodeposition. Gradient coatings have continuous change of grain size in the direction of deposition. The presentation focuses on the influence of the microstructure of the material on the strength and wear resistance.