Investigation on the microstructure and properties of composite nickel coatings with nanodiamond

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The work in this study is focused on investigation of composite nickel coatings. The coatings are deposited on ductile cast iron samples by electroless method EFTTOM NICKEL with addition of strengthened nanodiamond particles (2-4 nm) [1,2]. The ductile cast iron is of different composition. The samples are prepared by casting and austempering. The microstructure, microhardness and wear resistance of the coatings are investigated. The thickness of the coatings is also determined (8-10μm). Metallographic analyses, electronic microscopic analysis (SEM), microhardness measurements by Knoop Method, wear resistance tests are carried out. The coatings without heat treatment as well coatings with heat treatment at 290°C, 6 h are tested. Twice increase in microhardness value and improvement of the coating's properties of heat treated coatings is determined.

[1] Gavrilov, G. Electroless Nickel, Sofia, Bulgaria (1976).
[2] Karaguiozova, Z., Stavrev, S., Formation of nickel layer-covers on nanodiamond powder, Paper presented at the 8th International Workshop, Nanoscience & Nanotechnology, November 2006, Sofia, Bulgaria (2006).