

Application of nanostructured coatings by plasma spraying

Kravchenko I., Kolomeichenko A., Sharifullin S., Kuznetsov Y., Baranov Y., Glinsky M.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2018 Institute of Physics Publishing. All rights reserved. Nanostructured coatings demonstrate lower porousness by an order of magnitude, a far higher tenacity to wear, corrosion and erosion. The article presents the investigations of new method of nanostructured coatings application consisting in plasma spraying of material supplied into plasma jet and nanoparticles in suspension or solution followed by coating surface melting by air plasma jet.

<http://dx.doi.org/10.1088/1742-6596/1058/1/012046>

Keywords

additive, carbides, coating, microstructure, nanoparticles, oxides, plasma, plasma jet, substrate, wear, wear resistance

References

- [1] Baldaev L.Kh. 2007 Gas thermal spraying: study book ed L.Kh. Baldaev, V.N. Borisov and V.A. Vakhalin 344 under the general editorship of L.Kh. Baldaev: Market DS
- [2] Puzryakov A.F. 2008 Theoretical foundations of plasma spraying technology 2 ed A.F. Puzryakov 360 updated and revised.: Publishing house Moscow State Technical University named after N.E. Bauman
- [3] Kolomeichenko A.V. 2013 Technolpgy of machine repair. Laboratory course: study book. Part II ed A.V. Kolomeichenko, V.N. Logachev, N.V. Titov et al (Orel: Publishing house Orel State Agrarian University) 156
- [4] Kravchenko I.N. 2016 Investigation of process of self-fluxing alloys plasma spraying by external arc with coating melting ed I.N. Kravchenko, A.V. Kolomeichenko, A.A. Kolomeichenko and D.M. Butenko 22-25 Welding engineering
- [5] Kuznetsov Yu.A. 2011 Innovative methods of gas thermal spraying of coatings: monograph ed Yu.A. Kuznetsov, V.V. Goncharenko and K.V. Kulakov (Orel: Orel State Agrarian University) 124
- [6] Kuzmin V.I. 2015 Plasma spraying of wear resistant coatings from self-fluxing alloys powders ed V.I. Kuzmin, S.P. Vashhenko, I.P. Gulyaev et al (Bulletin of Ugra State University) 45-52 37
- [7] Sosnin N.A. 2008 Plasma technologies ed N.A. Sosnin, S.A. Ermakov and P.A. Topolyansky 406 SPb.: Publishing house St. Petersburg Polytechnic University
- [8] Pawlowski L. (ed) 2008 Science and Engineering of Thermal Spray Coatings 2 (John Wiley & Sons, Ltd) 656
- [9] 2015 Temperature measurements for Ni-Al and Ti-Al phase control in SHS Synthesis and plasma spray processes 44 83-92 High Temperatures-High Pressures
- [10] Kuzmin V.I. 2012 J. of Thermal Spray Technology 21 ed V.I. Kuzmin, A.A. Mikhalchenko, O.B. Kovalev et al The technique of formation of the axisymmetric heterogeneous flow for thermal spraying of powder materials 159-168
- [11] Kornienko E E, Lapushkina E J, Kuzmin V I, Vaschenko S P, Gulyaev I P, Kartaev E V, Sergachev D S, Kashapov N, Sharifullin S and Fayrushin I 2014 J. Phys.: Conf. Ser. 567 012010
- [12] Kashapov N F and Sharifullin S N 2015 IOP Conf. Ser.: Mater. Sci. Eng. 86 012021

- [13] Kolomeichenko A.V. 2015 Education, science and industry ed A.V. Kolomeichenko, V.N. Logachev and N.N. Litovchenko Improvement of equipment and technology at thermal spraying 27-32
- [14] Kashapov L N, Kashapov N F and Kashapov R N 2014 J. Phys.: Conf. Ser. 567 012025
- [15] Saifutdinov A I, Fairushin I I and Kashapov N F 2016 JETP Lett. 104 180-185
- [16] Puzryakov A.F. 2014 New approaches to increase the resource of engineering parts by methods of nanostructured material gas thermal spraying ed A.F. Puzryakov, I.N. Kravchenko, A.V. Kolomeichenko et al 32-35 Repair. Reconditioning. Modernization
- [17] Kravchenko I.N. 2011 Method of management of residual stresses in plasma coatings ed I.N. Kravchenko, A.F. Puzryakov and I.E.V. Pankratova 6-11 Repair. Reconditioning. Modernization
- [18] Kravchenko I.N. 2012 Thermophysical model of determination of residual stresses in plasma coatings ed I.N. Kravchenko, E.V. Pankratova and O.Ya. Moskal' 34-40 Repair. Reconditioning. Modernization 11
- [19] Kravchenko I.N. 2012 Evaluation of machine and equipment reliability. Theory and practice: study book ed I.N. Kravchenko, E.A. Puchin, A.V. Cheputin et al 336 M.: Alfa-M., INFRA-M