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EDUCATIONAL BACKGROUND

M.Sc. (1996) in Materials Science (Corrosion), University of Tehran (Iran)

Ph.D. (2002) in Materials Science and Engineering, University of Tehran (Iran)

Ph.D. Thesis: Microstructure and Hot Corrosion/Cyclic Oxidation Behavior of Si-Aluminide Coating on Superalloy In-738
Research short period: Tsuru-Nishikata Lab., Tokyo Institute of Technology (October 2001-May 2002), under supervision of Prof. Atsushi Nishikata

PROFESSIONAL EXPERIENCE

Associate Professor of High Temperature Coating and Corrosion.

Director, Central Office of University & Industry Partnerships, 2006-October 2014.

Laboratory Director, High Temp. Corrosion and Coatings Lab., IROST, 2005- present.

Member of directing board of TD-Coatings Company, 2011-present (Service: Aluminide coatings for gas turbine blades).

Conducted Projects

1. Design and manufacturing of a high-pressure high velocity burner rig test.
2. Application of Pt-aluminide coatings on superalloy In-738 by EB-PVD and pack cementation processes
3. Application of Pt-Aluminide coating on superalloy Rene-80 by electroplating and Pack Cementation Processes
4. Development of APS TBC coating systems with pack Pt-, Si- and plain-aluminide bond coats.
5. Cyclic oxidation behavior of over-pack, slurry and pack aluminized HVOF CoNiCrAlY coatings (current project).
6. Development of slurry Si-aluminide coating on Ni-base superalloy In-738.
7. Coating application on cooling passage surfaces of gas turbine blades by slurry aluminizing method.
8. Electrochemical study of molten salt Corrosion of aluminide coating on superalloy In-738
9. Study of hot corrosion and cyclic oxidation resistance of six Ni-base superalloys
10. Study on morphology and corrosion behavior of chromate conversion coatings on Al alloy 7075 and 2024
11. Application and characterization of alumina-reinforced epoxy composite coatings

PATENTS

1. Application of Pt-Aluminide coating on Ni-base superalloy Rene-80, IRI Patent No. 64582 (2010).
2. Slurry Silicoaluminizing Technique for Protection of Cooling Air Passages of Gas Turbine Blades, IRI Patent No. 51538 (2008).
3. Slurry Si-modified Aluminide Coatings for Ni-base Superalloys, IRI Patent No. 54266 (2008).
4. Chromate Conversion Coatings for 2xxx and 7xxx Al Alloys According to Aerospace Requirements, IRI Patent No. 5663 (2008).
5. Automatic Testing Device for Evaluation of Cyclic Oxidation Behavior of High Temperature Alloys and Coatings, IRI Patent No. 56630 (2008).
6. Device for measurement Electrical Contact Resistance of Chemical Films, IRI Patent No. 37064: (2006).

IRI: Islamic Republic of Iran

PROFESSIONAL ASSOCIATIONS AND HONORS

- Earned Excellence Award for Commercialized Research Work -National Sahand Research & Technology Award (2014)
- Earned Excellence Award for Technology Developing (Iranian Ministry of Science and Technology) (2013)
- Earned Excellence Award for Research (2012, Top researcher at IROST)
- Member, the Iranian Corrosion Association (ICA) boarding of directors (2006- 2010).
- Member, Iranian Corrosion Association (2006-2014)
- Member, Iranian Association of Surface Engineering (2007-2014)
- Scientific Secretary, ICA International Corrosion Congress 2007.
- Member, NACE International (2007-2010).
- Earned Visiting Researcher Position, Tokyo Institute of Technology 2001.
- Member, Material & Metallurgy Sub-committee of Khwarizmi International Award Evaluation Committee 2002-2014.
- Third rank, Administration Exam of M.Sc. 1994.
- Top Student, M.Sc. 1996.
- First rank, Administration Exam of Ph.D. 1996.
- Top Student: PhD Course (University of Tehran, 2002)
- Elected Fellow, Iranian Ministry of Science, Research and Technology 1997.

PUBLICATIONS

1. Seyed A. Azarmehr, K. Shirvani, M. Schütze, M. Galetz, Microstructural evolution of silicon-platinum modified aluminide coatings on superalloy GTD-111, Surface & Coatings Technology 321, 455-463, 2017.
2. K. Shirvani, S. V. Miraboutalebi, Cyclic Oxidation Performance of Si-Aluminide/MCrAlY Coating on Ni-Base GTD-111 Superalloy, Materials Science Forum, Vol. 889, pp 159-164, 2017.
3. K. Shirvani, A. Rashidghamat, Evolution of Oxide Scale on Aluminide and Pt-Aluminide Coatings Exposed to Type I (870 °C) Hot Corrosion, Oxidation of Metals , 85 (1-2) pp. 75 – 85, 2016.
4. K. Shirvani, S. Mastali, H. Abdollahpour, Thermal shock behavior of ZrO_2-8%Y_2O_3 coating on aluminized superalloy In-738LC, *Iranian Journal of Surface Science and Technology* 20 (2014) 103-111.
5. K. Shirvani, S. Mastali, H. Abdollahpour, A. Rashidghamat, The Effect of Silicon on Thermal Shock Performance of Aluminide-Thermal Barrier Coatings, *Corrosion Science* 75 (2013)142-147.
6. M. Mohammadi, S. Javadpour, A. Kobayashi, S.A. Jenabali Jahromi, K. Shirvani, Thermal shock properties and microstructure investigation of LVPS and HVOF-CoNiCrAlYSi coatings on the IN738LC superalloy, *Vacuum* 86 (2012) 1458-1464.
7. M. Mohammadi, S. Javadpour, S.A.J. Jahromi, K. Shirvani, A. Kobayashi, Characterization and hot corrosion performance of LVPS and HVOF-CoNiCrAlYSi coatings, *Vacuum* 86(10) (2012) 1458-1464.
8. M. Taheri, A. Salemi Golezani, K. Shirvani, Effect of aluminide coating on rapture behavior of Ni-Based superalloy GTD-111 in high temperature, *Advanced Materials Research* 457-458 (2012) 330-333.
9. M. Mohammadi, S. A. Jenabali Jahromi, S. Javadpour, A. Kobayashi and K. Shirvani, Hot corrosion behavior and microstructural change of Al-gradient CoNiCrAlYSi coatings, Produced by LVPS and Diffusional Processes, *Oxidation of Metals* 78 (2012) 17-30.
10. K. Shirvani, S. Firouzi, A. Rashidghamat, Microstructures and cyclic oxidation behaviour of Pt-free and low-Pt NiAl coatings on the Ni-base superalloy Rene-80, *Corrosion Science* 55 (2012) 378-384.
11. K. Shirvani and S. Mastali, Effect of grain refinement and immersion time on morphology, topography and corrosion resistance of CCC-coated 7075 Al Alloy, *Journal of the Electrochemical Society* 159 (2) (2012) C74-C79.
12. M. Mohammadi, S. Javadpour, A. Kobayashi, K. Shirvani, S.A. Jenabali Jahromi, I. Khakpour, Cyclic Oxidation Behavior of CoNiCrAlY Coatings produced by LVPS and HVOF Processes, *Transactions of JWRI* 40 (2011) 53-58.
13. K. Shirvani, A. Firouzi, The structure and high temperature corrosion performance of medium-thickness aluminide coatings on nickel-based superalloy GTD-111, *Corrosion Science* 52 (2010) 3579-3585.
14. A. Firouzi, K. Shirvani, Internal surface protection of gas turbine blade by Si-aluminide coating, *Materials and Corrosion* 7 (2011) 681-686.

15. K. Shirvani, Thermophysical and Electrical Properties of Chromate Conversion Coatings on Alclad AA7075-T6 Aluminum Alloy, *Iranian Journal of Surface Science and Technology* 6 (2009) 85-92.
16. K. Shirvani and A. Firouzi, Aluminide Coating Formation on Internal Passages of GTD-111 Superalloy by Slurry Technique, J. of *Materials Science Forum* 595 (2008) 185-190.
17. K. Shirvani, M. Saremi and Y. Yamamoto, The Approaches to Thin Film Preparation and TEM Observations on Slurry Si-modified Aluminide Coatings, *J. of Materials and Corrosion* 57, 2 (2006) 182-184.
18. K. Shirvani, M. Saremi, A. Nishikata and T. Tsuru, The Effect of Silicon on cyclic Oxidation behavior of Aluminide coatings on Superalloy In-738LC, *Materials Science Forum* 461 (2004) 335-342.
19. K. Shirvani, M. Saremi, A. Nishikata and T. Tsuru, Electrochemical Study on Hot Corrosion of Si-modified Aluminide Coated In-738LC in Na_2SO_4-20wt.% NaCl melt at 750C, *Corrosion Science* 45 (2003) 1011-10231.
20. K. Shirvani, M. Saremi, A. Nishikata and T. Tsuru, The Role of Silicon on Microstructure and High Temperature Performance of Aluminide Coating on Superalloy In-738LC, *Materials Transactions* 43,10 (2002) 2622-2628.
21. K. Shirvani, A. Rashidghamat, M. Mohammadi, Evolution of Oxide Scale on Aluminide and Pt-Aluminide Coatings Exposed To Type I Hot Corrosion Condition, International Symposium on High Temperature Oxidation and Corrosion 2014 (ISHOC2014), Hakodate, Japan, June 23-27, 2014.
22. K. Shirvani, Kh. Haddadipour, Improvement of oxidation resistance of SOFC metallic interconnects by aluminizing (in Persian), 15th Iranian Corrosion Congress, Tehran, Iran, October 21-22, 2014.
23. K. Shirvani, H. Esmaili, V. Miraboutalebi, Interface thermal stability of aluminide and Si-aluminide coatings with superalloy In-738 substrate (in Persian), 15th National Surface Engineering Conference, Tehran Iran, October 21-22, 2014.
24. Kh. Haddadipour, K. Shirvani, S. Javadpour, Application and Microstructural Aspects of Pack Aluminide and Slurry Silicon-Aluminide Coatings on P91 Steel, 8th International Symposium on High-Temperature Corrosion and Protection of Materials, Les-Embiez, France, May 20-25, 2012.
25. A. Rashidghamat, M. Firouzi, K. Shirvani, The effect of high vacuum heat treatment on adhesion of Pt-electroplated coating on superalloy Rene-80, 11th European Vacuum Conference, EVC-11, Salamanca-Spain, September 20-24, 2010.
26. A. Rashidghamat, K. Shirvani, M. Firouzi, Microstructural aspects of plain and Pt-aluminide coatings on Ni-base superalloy Rene-80, International symposium on high-temperature oxidation and corrosion 2010, Zushi, Japan, November 8-11, 2010.
27. A.Rashidghamat, M. Firouzi, K. Shirvani, Electrodeposition of Pt on nickel-base superalloy Rene-80, European Federation of Corrosion Workshop (EFC-Event No. 321) Solutions for High Temperature Corrosion Protection in Energy Conversion Systems, Dechema Frankfurt-Germany, September 28-30, 2009.

28. K. Shirvani, A. Firouzi, Cyclic oxidation behavior of plain and Si-modified aluminide coatings on superalloy GTD-111(in Persian), 10th Iranian Surface Engineering Conference, Isfahan-Iran, February 23-24, 2010.
29. K. Shirvani, Si-modified aluminide coatings; an overview (in Persian), 11th Iranian Surface Engineering Conference, Tehran-Iran, October 14-16, 2010.
30. A. Rashidghamat, M. Firouzi, K. Shirvani, The effect of Pt content on the formation of dual-phase structure in Pt-modified aluminide coatings (in Persian), 11th Iranian Surface Engineering Conference, Tehran-Iran, October 14-16, 2010.
31. S. Mastali, K. Shirvani, Cyclic oxidation and hot corrosion behavior of four Ni-base superalloys Rene-80, GTD-111, In-738 and B-1900 (in Persian), 11th Iranian Corrosion Congress, Kerman-Iran, May 12-14, 2009.
32. A. Firouzi, K. Shirvani, Stability of plain and Si-modified aluminide coatings on superalloy GTD-111 exposed to type II hot corrosion condition (in Persian), 11th Iranian Corrosion Congress, Kerman-Iran, May 12-14, 2009.
33. K. Shirvani, S. Mastali, H. Abdollahpour, Structure and performance of NiAl-TBC coating in cyclic oxidation conditions (in Persian), 12th Iranian Corrosion Congress, Tehran-Iran, May 17-18, 2011.
34. K. Shirvani, A. Rashidghamat, M. Firouzi, A. Saatchi, Hot corrosion behavior of Plain and Pt-modified aluminide coatings applied on superalloy Rene-80 (in Persian), 12th Iranian Corrosion Congress, Tehran-Iran, May 17-18, 2011.
35. K. Shirvani, A. Rashidghamat, M. Firouzi, The effect of post-diffusion heat treatment on elemental and phase distribution of an electroplated layer on superalloy Rene-80 (in Persian), 12th Iranian Surface Engineering Conference, Isfahan-Iran, May 10-12, 2011.
36. K. Shirvani, M. Firouzi, A. Rashidghamat, V. Varmazyar, Application and characterization of Pt-modified aluminide coatings on a Jet-engine turbine blade (in Persian), 12th Iranian Surface Engineering Conference, Isfahan-Iran, May 10-12, 2011.
37. Kh. Haddadipour, K. Shirvani, S. Javadpour, Improvement of steam oxidation resistance of stainless steel SS321 by aluminizing (in Persian), 13th Iranian Corrosion Congress, Tabriz-Iran, May 5-7, 2012.
38. M. Esmailian, K. Shirvani, S. Aziminam, H. Monajati, Corrosion and erosion behavior of Stellite-6 coatings applied by HVOF and TIG (in Persian), 13th Iranian Corrosion Congress, Tabriz-Iran, May 5-7, 2012.
39. M. Aghaee Samani, K. Shirvani, S. Aziminam, The effect of Si on thermal shock behavior of slurry aluminide coatings (in Persian), 13th Iranian Corrosion Congress, Tabriz -Iran, May 15-17, 2012.
40. V. Miraboutalebi, K. Shirvani, H. Monajati, M. Salehi, Application and characterization of Aluminide-CoNiCrAlY coating on Ni-base superalloy GTD-111 (in Persian), 13th Surface Engineering Conference, Tabriz-Iran, May 13-15, 2012.
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43. A. Firouzi, K. Shirvani, Internal Surface Protection of Gas Turbine Blade, Solutions for High Temperature Corrosion Protection in Energy Conversion Systems, Frankfurt-Germany: 30 Sep.- 2 Oct., 2009.
44. M. Firouzi, K. Shirvani, R. Gholamipour, A. Rashidghamat, The role of vacuum heat treatment in application of diffusion coatings on gas turbine blades (in Persian), 4th Iranian Vacuum Conference, Isfahan-Iran, February 23-24, 2010.
45. H. Yazdani, M. Aghaee, K. Shirvani, A. Firouzi, A study on coating formation mechanism of Si-modified aluminide coating on superalloy GTD-111 (in Persian), 4th Iranian Vacuum Conference, Tehran-Iran, February 20-21, 2008.
46. K. Shirvani, A. Firouzi, H. Yazdani, M. Aghaee, M. Saremi, Internal and External Protection of Gas Turbine Blades by Slurry Silicoaluminizing Process, Iranian Corrosion/ICA International Corrosion Congress, Tehran-Iran, May 13-16, 2007.
47. K. Shirvani and A. A. Bitarafan, Influence of Chromate Conversion Coating and its Corrosion on Electrical Contact Resistance of Alclad AA2024-T3, Iranian Corrosion/ICA International Corrosion Congress, Tehran-Iran, May 13-16, 2007.
48. K. Shirvani, Initial Adhesion and its Durability for Paint Layers Applied on Chromate Conversion Coated Hardened Al Alloys, 14th Asian-Pacific Corrosion Congress, Shanghai-China, October 21-24, 2006.
49. K. Shirvani et al., Thermophysical and Electrical Properties of Chromate Conversion Coatings on Al Alloy 7075-T6 (in Persian), 7th National Seminar on Surface Engineering and Heat Treatment, Isfahan-Iran, May 16-17, 2006.
50. K. Shirvani, M. Saremi, A. Nishikata, T. Tsuru, The Retarding Role of Silica on Molten Salt Corrosion Behavior of Aluminide Coatings, 16th International Corrosion Congress, Beijing-China, September 19-24, 2005.
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52. K. Shirvani and M. Saremi, Creep Rupture Behavior of ASTM A102 (in Persian), Steel Symposium 99, Isfahan-Iran, May 10-11, 1999.
53. M. Saremi, S. Zahabi, K. Shirvani and M. Khalichi, Application of Pt-Aluminide Coatings on Ni-base Superalloy In-738LC by EB-PVD and Pack Cementation Processes, RTEC Technical Report, no. 3-8/4/1374 (1997).

REFERENCES

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