



Motofumi OHKI, Ph.D.

Associate Professor

Program: Advanced Materials Science and Technology

Area: Materials Science and Technology

Undergraduate: Dept. of Engineering

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Professional Expertise

His professional expertise is mainly related to strength of materials, especially mechanical property of coated materials. He and his group have found thermal cycle damage behavior of thermal barrier coatings (TBCs) material, and influence of high-temperature exposure on elastic and thermal barrier properties of TBCs top coating. They have also found influence of thermal treatment on growth behavior of HOT-DIP tin plated material's intermetallic layer.

Research Fields of Interest

Evaluation of mechanical or other properties of coated materials

- TBCs damage caused by thermal cycling / high-temperature exposure
- Elastic and thermal barrier properties changes caused by high-temperature exposure
- Growth behavior of HOT-DIP tin-plated material's intermetallic layer

Creation of new functional metallic / inorganic coated materials

- Tungsten carbide thin film materials created by diffusion thermal treatment, and its mechanical properties
- Hydroxyapatite thin film materials created by sol-gel method, and its adhesive strength

Establishment of analysis method for instrumented indentation test

Education

2002: Ph.D in Eng., Graduate School of Engineering, Nagaoka University of Technology, Japan

1995: Master Eng., Graduate School of Engineering, Nagaoka University of Technology, Japan

1993: Bachelor Eng., School of Engineering, Nagaoka University of Technology, Japan

Professional Societies and Activities

1. The Japan Society for Mechanical Engineers
2. The Society of Materials Science, Japan
3. Japan Welding Society
4. Japan Thermal Spray Society
5. Material Testing Research Association of Japan

Awards

1. Paper Award, Material Testing Research Association of Japan, 2009
2. Paper Award, Material Testing Research Association of Japan, 2005
3. Paper Award, Japan Thermal Spray Society, 2002
4. Young Researcher Award, Japan Thermal Spray Society, 2000

Major Publications

Papers

- [1] "Proposal for ISO 14577-1 (1st. Re-evaluation of unloading curve's profile at neighborhood of unloading starting point and discussion of real maximum contact depth)", *Journal of Material Testing Research Association of JAPAN*, vol.56, no.2, pp.54-63, 2011.
- [2] "Proposal for ISO 14577-1 (2nd. Discussion for relationships between maximum projected area and real maximum contact depth, and computing method of Young's modulus based on area function for the relationships)", *Journal of Material Testing Research Association of JAPAN*, vol.56, no.2, pp.64-75, 2011.
- [3] "Analysis of the Strength of Car Seats Concerning Seat Belt Injuries", *Journal of Material Testing Research Association of JAPAN*, vol.55, no.2, pp.26-32, 2010.
- [4] "Evaluation of Top Coat Young's Modulus of Thermal Barrier Coatings by Instrumented Indentation Test", *Journal of Material Testing Research Association of JAPAN*, vol.55, no.2, pp.11-19, 2010.
- [5] "Correction Method of Young's Modulus Measurement for Top Coat of Thermal Barrier Coatings by Instrumented Indentation Test with Spherical Indenter", *Journal of Solid Mechanics and Materials Engineering (e-pub)*, vol.4, no.2, pp.286-293, 2010.
- [6] "Analysis of the crash tests concerning seat belt injuries caused by deformation of seats (Proposal for safety standards for seat strength)", *Journal of the Japanese Council of Traffic Science*, vol.9, no.1, pp.25-34, 2009.
- [7] "Characteristics of Micro Vickers Standard Blocks for Hardness (H_{MV}) in Ultra Small Indentation Depth Including the Vicinity of Elastic Contact Area", *Journal of Material Testing Research Association of JAPAN*, vol.54, no.2, pp.74-84, 2009.
- [8] "Intermetallic Layer Growth and Adhesive Strength on HOT-DIP Tin-Plated Materials", *Journal of Material Testing Research Association of JAPAN*, vol.54, no.2, pp.26-33, 2009.
- [9] "The Injuries Caused by the Seat Belts through the Deformation of the Seats", *International Journal of Automotive Engineering*, vol.40, no.2, pp.269-275, 2009.
- [10] "Young's Modulus Evaluation by Micro Range Indentation using SHIMADZU Dynamic Hardness Tester DUH-201S with Diamond Spherical Indenter", *Journal of Material Testing Research Association of JAPAN*, vol.53, no.2, pp.93-100, 2008.
- [11] "Practical Nanoindentation Theory and Experiments of the Pyramidal Indenter (11th. Exact quantification method of profile coefficients for Microvickers nanoindentation indenter's tip profile using corresponding ball diameter function)", *Journal of Material Testing Research Association of JAPAN*, vol.53, no.2, pp.101-107, 2008.
- [12] "Practical Nanoindentation Theory and Experiments of the Pyramidal Indenter (10th. Exact relationships and equations of contact depths for the conical indenter in ISO14577-1, and comparisons of ϵ values between ISO and authors for ball and conical indenter)", *Journal of Material Testing Research Association of JAPAN*, vol.52, no.2, pp.25-31, 2007.

- [13] "Influence of Load Dependency and Coating Anisotropy on Calculated Young's Modulus of TBCs by Indentation Test", *Materials Transactions*, vol.47, no.4, pp.1170-1177, 2006.
- [14] "Practical Nanoindentation Theory and Experiments of the Pyramidal Indenter (9th. Exact relationships and equations of contact depths for the rounded tip of pyramidal indenter and/or ball indenter in ISO 14577-part1)", *Journal of Material Testing Research Association of JAPAN*, vol.51, no.2, pp.55-61, 2006.
- [15] "Practical Nanoindentation Theory and Experiments of the Pyramidal Indenter (7th. AFM profiles of Microvickers indenter tip and elastic indentation equations between the hyperboloid of revolution indenter and plane specimen)", *Journal of Material Testing Research Association of JAPAN*, vol.50, no.2, pp.35-42, 2005.
- [16] "Practical Nanoindentation Theory and Experiments of the Pyramidal Indenter (8th. Elastic indentation experiments with truncated Microvickers indenter and comparison between experimental results and calculated values using elastic indentation equations)", *Journal of Material Testing Research Association of JAPAN*, vol.50, no.2, pp.43-49, 2005.
- [17] "Young's Modulus Measurement of the Thermal Barrier Coatings using the Indentation Testing", *Journal of Japan Thermal Spray Society*, vol.41, no.4, pp.152-159, 2004.
- [18] "Practical Nano-indentation Theory and Experiments of the Pyramidal Indenter (5th. Comparison between the calculated truncation length of the Berkovich indenter tip with the expanded nano-indentation theory and that with the AFM testing)", *Journal of Material Testing Research Association of JAPAN*, vol.49, no.2, pp.25-32, 2004.
- [19] "Practical Nano-indentation Theory and Experiments of the Pyramidal Indenter (6th. Influence of the geometrical shape of a triangular pyramid indenter on the hardness value H_{IBerko}. during indentation over the wide load ranging from 0.2 mN to 2000 mN)", *Journal of Material Testing Research Association of JAPAN*, vol.49, no.2, pp.33-40, 2004.

Book Chapters

- [1] Ohki, M. 1998. "Interface Dependence of Thermal Conductivity of Plasma-sprayed Coatings of Zirconia, Partially Stabilized by Yttria" *Ceramic interfaces: properties and applications*, IOM Communications, pp.297-313.