Masaaki Okubo **Professor, Ph. D.**

Department of Mechanical Engineering, Graduate School of Engineering
Osaka Metropolitan University, 1-1 Gakuen-cho, Sakai 599-8531, Japan
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Date of Birth

1961 Dec. 22

Education

Ph.D. thesis	A Study on Interfacial and Flow Phenomena of Magnetic Fluids in Unsteady Magnetic Fields, Tokyo Institute of Technology, 31 March, 1990
1987 Apr. - 1990 Mar.	Department of Mechanical Engineering, Tokyo Institute of Technology, Ph.D.
1985 Apr. - 1987 Mar.	Department of Mechanical Engineering, Tokyo Institute of Technology, M.S.
1981 Apr. - 1985 Mar.	Department of Mechanical Engineering, Tokyo Institute of Technology, B.S.

Academic Experience

2022 Apr. - present	Full Professor of Osaka Metropolitan University, Department of Mechanical Engineering (In April 2022, Osaka Prefecture University was reorganized into Osaka Metropolitan University.) Research involved application of nonthermal plasma for environmental protection and material surface treatment. Lectures in Environmental Protection Engineering and Sustainable Energy of Mechanical Engineering for undergraduate students, and Environmental Protection Engineering I and II for graduate students.
2006 Apr. - 2022 Mar.	Full Professor of Osaka Prefecture University, Department of Mechanical Engineering Research involved application of nonthermal plasma for environmental protection and material surface treatment. Lectures in Environmental Protection Engineering and General Course of Mechanical Engineering for undergraduate students, and Environmental Protection Engineering I and II for graduate students.
2015 Oct. - 2016 Mar.	Guest Professor of Tohoku University (concurrent working post), Institute of Fluid Science. Research and lectures involved application of nonthermal plasma for environmental protection and industry applications.
2000 Apr. - present	Invited Lecturer of Doshisha University (concurrent working post), Department of Mechanical Engineering. Lectures involved fluid mechanics and computer simulation programing.
1998 Oct. - 2006 Mar.	Associate Professor of Osaka Prefecture University, Department of Mechanical Engineering. Research involved application of nonthermal plasma for environmental protection and material surface treatment.

Lectures in Energy Systems Engineering II and Fluid dynamics for undergraduate students, and Environmental Protection Engineering I for graduate students.

1993 Apr - 1998 Sep. Assistant Professor of Tokyo Institute of Technology, Research Laboratory for Nuclear Reactors.
Research involved development of MHD energy conversion system using high-pressure noble gas plasma.

1990 Apr. - 1993 Mar. Assistant Professor of Ministry of Education, Tohoku University, Institute of Fluid Science.
Research involved magnetic fluid dynamics in the magnetic field and plasma engineering.

Prizes and Awards

2020.09: Book of the Year Award (Institute of Electrostatics Japan)
2017.06: Distinguished Paper Promotion Award (Japan Ozone Association)
2016.09: Dr. Senichi Masuda Award (International Society of Electrostatic Precipitation)
2016.05: Distinguished Paper Award (Japan Ozone Association)
2015.09: Technical Development Award (Institute of Electrostatics Japan)
2015.03: Kansai Branch 90th Anniversary Meritorious Person Award (Japan Society of Mechanical Engineers, Kansai Branch)
2013.09: Technical Development Award (Institute of Electrostatics Japan)
2013.07: Environmental Engineering Award (Japan Society of Mechanical Engineers, Environmental Division)
2011.11: Distinguished Paper Award (The Japan Society of Applied Electromagnetics and Mechanics)
2010.06: Environmental Engineering Award for Technological Achievement (Japan Society of Mechanical Engineers, Environmental Division)
2009.09: Higashin Business Award, Academic Encourage Division (Osaka Higashi Shinyo Bank)
2006.07: James Melcher Prize Paper Award (IEEE Industry Applications Society, Electrostatic Processes Committee)
2006.06: Gakken Science Award (Research Promotion Award) (Gakken Co., Ltd)
2005.08: Innovation and Creativity Prize Paper Award (IEEE Industry Applications Society, Electrostatic Processes Committee)
2004.10: James Melcher Prize Paper Award (IEEE Industry Applications Society, Electrostatic Processes Committee)
2003.10: James Melcher Prize Paper Award (IEEE Industry Applications Society, Electrostatic Processes Committee)
2003.06: Ishimoto Memorial Descent Sports Science Promotion Award (Second Prize), (Ishimoto Memorial Descent Sports Science Promotion Foundation)
2001.09: Distinguished Paper Award (Institute of Electrostatics Japan)
1999.04: KSVF Venture Idea Prize (KSVF Venture Forum)
1994.05: Prof. Tejima Industrial Foundation, Prof. Nakamura Prize (Tokyo Institute of Technology)
1992.01: Kiki Kenkyu-Kai Research Promotion Prize (Tohoku University)
1991.04: JSME Research Promotion Prize (Japan Society of Mechanical Engineers)
1991.03: Prof. Tejima Industrial Foundation Prize (Tokyo Institute of Technology)
1991.03: Tokin Science and Technology Research Promotion Prize (Tokin Corporation)

Journal Publications

[2021]

1. S. Hirano, Y. Shimizu, T. Kuroki, and M. Okubo, Diesel Engine Exhaust Gas Treatment Technology Using NOx Recirculation Technique, *Journal of the Japan Institution of Marine Engineering*, 56 (5), pp. 824-829 (2021.5) (in Japanese).
2. H. Yamasaki, S. Nomura, X. Xun, T. Kuroki, J. Kang, T. Yagi, and M. Okubo, Toward NO_x/SO_x and Nanoparticle Control Technology Using a Single-Stage Wet-Type Nonthermal Plasma Reactor, *IEEE Transactions on Plasma Science*, 49 (6), pp. 1860-1870 (2021.6).
3. H. Yamasaki, Y. Mizuguchi , R. Nishioka, Y. Fukuda, T. Kuroki, H. Yamamoto, and M. Okubo, Pilot-Scale NO_x and SO_x Aftertreatment by Semi-Dry Plasma-Chemical Hybrid Process in Glass-Melting-Furnace Exhaust Gas, Springer US, *Plasma Chemistry and Plasma Processing*, 42, pp. 51-71 (2021.7).
4. M. Narita, M. Nakamura, T. Kuroki, and M. Okubo, Adhesive Polytetrafluoroethylene Films Fabricated Via Atmospheric Nonthermal Plasma Graft Polymerization, *Journal of the Adhesion Society of Japan*, 57 (7), pp. 280-290 (2021.7).

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5. T. Kuroki, M. Nakamura, K. Hori, and M. Okubo, Effect of Monomer Concentration on Adhesive Strength of PTFE Films Treated with Atmospheric-Pressure Nonthermal Plasma Graft Polymerization, *J. Electrostat*. 108, 103526 (2020.11)
6. K. Kishimoto, Y. Kumazawa, T. Kuroki, H. Yamasaki, and M. Okubo, Ultrasonically Enhanced Electrohydraulic Discharge for Removal of Organic Compounds, *J. Electrostat*., 108, 103502 (2020.9).
7. H. Yamasaki, S. Kamei, T. Kuroki, and M. Okubo, Adsorbed CO_2 Dissociation Using Argon and Helium Nonthermal Plasma Flows, *IEEE Transactions on Industry Applications*, 56 (6), 6983-6989 (2020.11).
8. T. Kuroki, S. Nomura, H. Yamasaki, and M. Okubo, Performance of a Wet-Type Nonthermal Plasma Reactor for NO_x, SO_x, and Wastewater Treatment, *IEEE Transactions on Industry Applications*, 56 (6), 6978-6982 (2020.11)
9. M. Okubo, Y. Hiroyasu, and T. Kuroki, Ion Cluster Formation by Nonthermal Plasma Induced by Pulse Corona Discharge Toward Indoor Air Cleaning, *IEEE Transactions on Industry Applications*, 56 (5), 5480-5488 (2020.9).
10. T. Kuwahara, K. Yoshida, T. Kuroki, K. Hanamoto, K. Sato, and M. Okubo, Pilot-Scale Combined Reduction of Accumulated Particulate Matter and NO_x Using Nonthermal Plasma for Marine Diesel Engine, *IEEE Transactions on Industry Applications*, 56 (2), 1804-1814 (2020.3).

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11. T. Kuroki, K. Hirai, S. Matsuoka, J. Y. Kim, and M. Okubo, Oxidative Decomposition of Adsorbed Toluene Using Ozone Concentrated by Nonthermal Plasma Flow, *IEEE Transactions on Industry Applications*, 55 (3), 3122-3128 (2019.5).
12. H. Yamasaki, Y. Koizumi, T. Kuroki, and M. Okubo, Plasma‐Chemical Hybrid NO_x Removal in Flue Gas from Semiconductor Manufacturing Industries Using a Blade-Dielectric Barrier-Type Plasma Reactor, *Energies*, Multidisciplinary Digital Publishing Institute, 12 (14), 2717 (2019.7).
13. T. Kuwahara, K. Yoshida, T. Kuroki, K. Hanamoto, K. Sato, and M. Okubo, High Reduction Efficiencies of Adsorbed NO_x in Pilot-Scale Aftertreatment Using Nonthermal Plasma in Marine Diesel-Engine Exhaust Gas,

Energies, Multidisciplinary Digital Publishing Institute, 12 (19), 3800 (2019.10).

14. H. Yamamoto, T. Kuroki, H. Fujishima, and M. Okubo, Pilot-Scale NO_x and SO_x Aftertreatment Using a Two-Phase Ozone and Chemical Injection in Glass-Melting-Furnace Exhaust Gas, *IEEE Transactions on Industry Applications*, 55 (6), 6295-6302 (2019.11).
15. Y. Togashi, T. Kuroki, and M. Okubo, Improvement in Molecular-Level Adhesive Strength of PTFE Film Treated by Atmospheric Plasma Combined Processing, K. Hori, S. Fujimoto, *IEEE Transactions on Industry Applications*, 55 (1), 825-832 (2019.1).
16. Y. Otaki, Y. Kumazawa, T. Kuroki, and M. Okubo, Phenol Decomposition Using Pulsed Discharge Plasma Combined with Ultrasound, *J. Inst. Electrostat. Jpn*. 43(1), 19-24 (2019.2). (in Japanese)

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17. K. Takehana, T. Kuroki, and M. Okubo, Evaluation on Nitrogen Oxides and Nanoparticle Removal and Nitrogen Monoxide Generation Using a Wet-Type Nonthermal Plasma Reactor, *Journal of Physics D: Applied Physics*, 51 (20), 204002, total 11 pages (2018.4).
18. M. Okubo, K. Takahashi, S. Kamiya, and T. Kuroki, High-Efficiency Carbon Dioxide Reduction Using Nonthermal Plasma Desorption, *IEEE Transactions on Industry Applications*, 54 (6), 6422-6429 (2018.11).

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19. T. Kuroki, M. Tanaka, and M. Okubo, Decomposition of Toluene Adsorbed on Hydrophobic Zeolite by Nonthermal Plasma Flow with Water Spray, *International Journal of Plasma Environmental Science & Technology*, 11 (1), 92-97 (2017.4).
20. M. Okubo, T. Kuroki, H. Yamada, K. Yoshida, and T. Kuwahara, CO_2 Concentration Using Adsorption and Nonthermal Plasma Desorption, *IEEE Transactions on Industry Applications*, 53 (3), 2432-2439 (2017.5).
21. T. Kuroki, S. Nishii, T. Kuwahara, and M. Okubo, Nanoparticle Removal and Exhaust Gas Cleaning Using Gas-liquid Interfacial Nonthermal Plasma, *Journal of Electrostatics*, 89, 86-92(2017.6).
22. T. Kuroki, T. Yamamoto, S. Nishii, M. Akita, and M. Okubo, Removal of High Concentrations of the Anesthetic Gas Nitrous Oxide Using Nonthermal Plasma Combined with an Adsorbent, *IEEE Transactions on Industry Applications*, 53 (6), 5852-5858 (2017.11).
23. M. Okubo, H. Yamada, K. Yoshida, and T. Kuroki, Simultaneous Reduction of Diesel Particulate and NOx Using a Catalysis-Combined Nonthermal Plasma Reactor, *IEEE Transactions on Industry Applications*, 53 (6), 5875-5882 (2017.11).

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24. H. Yamamoto, T. Kuroki, H. Fujishima, and M. Okubo, Pilot-Scale Exhaust Gas Treatment for a Glass Manufacturing System Using a Plasma Combined Wet Chemical Process, *Mechanical Engineering Journal*, Vol. 3, No. 1, pp. 15-00549-15-00549 (2016.1).
25. T. Kuwahara, H. Nakaguchi, T. Kuroki, and M. Okubo, Continuous Reduction of Cyclic Adsorbed and Desorbed NO_x in Diesel Emission using Nonthermal Plasma, *Journal of Hazardous Materials*, Elsevier, Vol. 306, No. 5, pp. 216-224 (2016.5).
26. H. Yamamoto, T. Kuroki, H. Fujishima, Y. Yamamoto, K. Yoshida, and M. Okubo, Pilot-Scale Exhaust Gas Treatment for a Glass Manufacturing System Using a Plasma Combined Semi-dry Chemical Process, *IEEE Transactions on Industry Applications*, 53 (2), 1416-1423 (2016.10).
27. M. Okubo, T. Onji, T. Kuroki, H. Nakano, E. Yao, and M. Tahara, Molecular-Level Reinforced Adhesion Between Rubber and PTFE Film Treated by Atmospheric Plasma Polymerization, *Plasma Chemistry and*

Plasma Processing, Springer, 36 (6), 1431-1448 (2016.11).

28. H. Yamamoto, T. Kuroki, H. Fujishima, Y. Yamamoto, K. Yoshida, and M. Okubo, NO_x and SO_x Removals for Exhaust Gas in Glass Melting Furnace Using a Plasma and Dry Chemical Hybrid Process, *Transactions of. JSME*, 82 (843), 16-00255, total 12 pages (2016.11). (in Japanese)

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29. T. Kuroki, K. Nakayama, D. Nakamura, T. Onji, and M. Okubo, Nonthermal Plasma Hybrid Process for Preparation of Organic Electro-luminescence Fluoropolymer Film Devices, *IEEE Transactions on Industry Applications*, Vol. 51, No. 3, pp. 2497-2503 (2015.5).
30. T. Kuroki, S. Nishii, and M. Okubo, Fundamental Study on the Simultaneous Removal of Nanoparticles and Harmful Gas Components Using a Wet-Type Discharge Plasma Reactor, Aerosol Research, *Japan Association of Aerosol Science and Technology*, Vol. 30, No. 2, pp. 108-113 (2015.6) (in Japanese).
31. T. Kuwahara, K. Yoshida, K. Hanamoto, K. Sato, T. Kuroki, and M. Okubo, Effect of Exhaust Gas Temperature on Oxidation of Marine Diesel Emission Particulates with Nonthermal-Plasma-Induced Ozone, *Ozone Science & Engineering*, Taylor & Francis, Vol. 37, No. 6, pp. 518-526, (2015.11).
32. Y. Yamamoto, H. Yamamoto, D. Takada, T. Kuroki, H. Fujishima, and M. Okubo, Simultaneous Removal of NOx and SOx from Flue Gas of a Glass Melting Furnace Using a Combined Ozone Injection and Semi-dry Chemical Process, *Ozone Science & Engineering*, Taylor & Francis (2015.11) (accepted, in press).
33. M. Okubo, Evolution of Streamer Groups in Nonthermal Plasma, *Physics of Plasmas*, AIP Publishing, Vol. 22, No. 12, 123515 (2015.12).

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34. T. Kuwahara, K. Yoshida, T. Kuroki, K. Hanamoto, K. Sato, and M. Okubo, Pilot-Scale Aftertreatment Using Nonthermal Plasma Reduction of Adsorbed NOx in Marine Diesel-Engine Exhaust Gas, Plasma Chemistry and Plasma Processing, Springer, Vol. 34, No. 1, pp. 65-81 (2014.1).
35. T. Kuroki, H. Yamamoto, H. Fujishima, D. Takada, Y. Yamato, M. Okubo, NOx Removal for Flue Gas in Glass Furnace using an Ozone Injection Chemical Hybrid Process(Laboratory Experiments with Semi-Dry Model System), *Journal of the Institute of Electrostatics Japan*, Vol. 38, No. 1, pp. 52-58 (2014.1) (in Japanese).
36. T. Kuroki, M. Tahara, T. Kuwahara, and M. Okubo, Microfabrication and Metal Plating Technologies on Polytetrafluoroethylene Film Surface Treated by Atmospheric Pressure Nonthermal Plasma Graft Polymerization Process, *IEEE Transactions on Industry Applications*, Vol. 50, No. 1, pp. 45-50 (2014.1).
37. M. Tahara and M. Okubo, Detection of Free Radicals Produced by a Pulsed Electrohydraulic Discharge Using Electron Spin Resonance, *Journal of Electrostatics, Elsevier*, Vol. 72, No. 3, pp. 222-227 (2014.6).

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38. T. Kuroki, T. Oishi, T. Yamamoto, and M. Okubo, Bromomethane Decomposition Using a Pulsed Dielectric Barrier Discharge, *IEEE Transactions on Industry Applications*, Vol. 49, No. 1, pp. 293-297 (2013.1).
39. H. Kido, T. Kuroki, M. Okubo, and Y. Utsumi, Application of Photo-Etching of Polytetrafluoroethylene Induced by High Energy Synchrotron Radiation to LIGA, *Microsystem Technologies*, Springer, Vol. 19, No. 9, pp. 301-307 (2013.3).
40. T. Kuwahara, M. Nishimoto, K. Yoshida, T. Kuroki, and M. Okubo, Effect of Exhaust Gas Temperature on Low-Temperature Treatment of Diesel Particulates with Indirect Plasma, *Transactions of JSME*, Vol. 79B, No.800, pp. 723-727 (2013.4) (in Japanese).
41. H. Fujishima, K. Takekoshi, T. Kuroki, A. Tanaka, K. Otsuka, and M. Okubo, Towards Ideal NOx Control

Technology for Bio-Oils and a Gas Multi-Fuel Boiler System Using a Plasma-Chemical Hybrid Process, *Applied Energy*, Elsevier, Vol. 111, pp. 394-400 (2013.11).

42. T. Kuwahara, S. Nishi, T. Kuroki, and M. Okubo, Complete Regeneration Characteristics of Diesel Particulate Filter Using Ozone Injection, *Applied Energy*, Elsevier, Vol. 111, pp. 652-656 (2013.11).
43. K. Yoshida, T. Kuwahara, T. Kuroki, and M. Okubo, Influence of Injection of Concentrated NOx into Diesel Engine Intake on Exhaust Gas Components and Fuel Consumption, *Electrical Engineering in Japan* (English translation of Denki Gakkai Ronbunshu), Vol. 182, No. 3, pp. 39-47 (2013.11).

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44. T. Kuwahara, M. Nishimoto, K. Yoshida, T. Kuroki, and M. Okubo, Development of Plasma-Assisted NOx Aftertreatment System for Clean Diesel Engine : Experiments with A type of Heavy Oil Fuel, *Journal of JSAEM*, the Japan Society of Applied Electromagnetics and Mechanics, Vol. 20, No. 1, pp. 21-27 (2012.3) (in Japanese).
45. T. Kuwahara, K. Yoshida, K. Hanamoto, K. Sato, T. Kuroki, T. Yamamoto, and M. Okubo, Continuous Regeneration Characteristics of Ceramic Particulate Filter in Marine Diesel Engine Using Nonthermal Plasma-Induced Ozone Injection, *Journal of the Japan Institution of Marine Engineering*, Vol. 47, No. 3, pp. 379-384 (2012.5).
46. T. Kuwahara, D. Shinohara, T. Kuroki, K. Yoshida, and M. Okubo, Development of Clean Diesel Engine with Plasma-Assisted Aftertreatment System (Achievement of System Energy Efficiency of 385 g(NO_2)/kWh Using Nonthermal Plasma and EGCR), *Transactions of JSME*, Vol. 78B, No. 789, pp. 1029-1033 (2012.5) (in Japanese).
47. Z. Feng, N. Saeki, T. Kuroki, M. Tahara, and M. Okubo, Surface Modification by Nonthermal Plasma Induced by Using Magnetic-Field-Assisted Gliding Arc Discharge, *Applied Physics Letters*, Vol. 101, No. 4, Article number 041602 (2012.7).
48. K. Yoshida, T. Kuwahara, T. Kuroki, and M. Okubo, Diesel NOx Aftertreatment by Combined Process Using Temperature Swing Adsorption, NOx Reduction by Nonthermal Plasma, and NOx Recirculation: Improvement of the Recirculation Process, *Journal of Hazardous Materials*, Elsevier, Vol. 231-232, pp. 18-25 (2012.9).
49. T. Kuwahara, K. Yoshida, K. Hanamoto, K. Sato, T. Kuroki, T. Yamamoto, and M. Okubo, Pilot-scale Experiments of Continuous Regeneration of Ceramic Diesel Particulate Filter in Marine Diesel Engine Using Nonthermal Plasma-Induced Radicals, *IEEE Transactions on Industry Applications*, Vol. 48, No. 5, pp. 1649-1656 (2012.9).
50. T. Kuwahara, T. Kuroki, K. Yoshida, N. Saeki, and M. Okubo, Development of Sterilization Device Using Air Nonthermal Plasma Jet Induced by Atmospheric Pressure Corona Discharge, *Thin Solid Film*, Elsevier, Vol. 523, pp. 2-5 (2012.11).

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51. T. Aoi, T. Kuroki, M. Tahara, and M. Okubo, Improvement of Strength Characteristics of Aerospace Fiber Reinforced Composite Materials Using Atmospheric Pressure Plasma-Graft Polymerization Treatment, *The Transactions of the Institute of Electrical Engineers of Japan*, Vol. 131A, No. 5, pp. 412-413 (2011.5) (in Japanese).
52. T. Kuwahara, M. Okubo, T. Kuroki, H. Kametaka, and T. Yamamoto, Odor Removal Characteristics of a Laminated Film-Electrode Packed-Bed Nonthermal Plasma Reactor, *Sensors*, Open Access Journal by Multidisciplinary Digital Publishing Institute, Vol. 11, No. 6, pp. 5529-5542 (2011.6).

53. T. Kuroki, K. Hirai, S. Matsuoka, J.Y. Kim, and M. Okubo, Oxidation System of Adsorbed VOCs on Adsorbent Using Nonthermal Plasma Flow, *IEEE Transactions on Industry Applications*, Vol. 47, No. 4, pp. 1916-1921 (2011.7).
54. M. Okubo, T. Kuroki, and N. Saeki, Simultaneous Removal of Odor and Particulate Using Plasma-Treated Polymer Filters, *Thin Solid Films*, Elsevier, Vol. 519, No. 20, pp. 6994-6998 (2011.8).
55. H. Fujishima, Y. Yoshioka, T. Kuroki, A. Tanaka, K. Otsuka, and M. Okubo, Development of Low-Emission Bio-Fuel Boiler System with Plasma-Chemical Hybrid NOx Reduction, *IEEE Transactions on Industry Applications*, Vol. 47, No. 5, pp. 2210-2217 (2011.9).
56. Z. Feng, N. Saeki, T. Kuroki, M. Tahara, and M. Okubo, Magnetic-Field-Assisted Gliding Arc Discharge Plasma for Surface Modification, *IEEE Transactions on Plasma Science*, Vol. 39, No. 11, pp. 2846-2847 (2011.11).
57. K. Yoshida, T. Kuwahara, T. Kuroki, and M. Okubo, The Influence on Exhaust Gas Components and Fuel Consumption of Injection of Concentrated NOx into Diesel Engine Intake, *The Transactions of the Institute of Electrical Engineers of Japan*, Vol. 131C, No. 11, pp. 1933-1939 (2011.11) (in Japanese).
58. T. Kuwahara, K. Yoshida, Y. Kannaka, T. Kuroki, and M. Okubo, Improvement of NOx Reduction Efficiency in Diesel Emission Control Using Nonthermal Plasma Combined Exhaust Gas Recirculation Process, *IEEE Transactions on Industry Applications*, Vol. 47, No. 6, pp. 2359-2366 (2011.11).

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59. T. Kuroki, M. Ishidate, M. Okubo, and T. Yamamoto, Charge-to-mass Ratio and Dendrite Structure of Diesel Particulate Matter Charged by Corona Discharge, *Carbon, Elsevier*, Vol. 48, pp. 184-190 (2010.1).
60. Y. Utsumi, S.Yamamoto, T. Kuroki, and M. Okubo, Direct Bonding of PTFE Sheets Assisted by Synchrotron Radiation Induced Surface Modification, *Microsystem Technologies*, Vol. 16, No. 8-9, pp. 1495-1500 (2010.2).
61. T. Kuroki, K. Hirai, R. Kawabata, M. Okubo, and T. Yamamoto, Decomposition of Adsorbed Xylene on Adsorbent Using Nonthermal Plasma with Gas Circulation*, IEEE Transactions on Industry Applications*, Vol. 46, No. 2, pp. 672-679 (2010.3).
62. H. Fujishima, T. Kuroki, T. Ito, K. Otsuka, T. Yamamoto, K. Yoshida, and M. Okubo, Performance Characteristics of Pilot-Scale Indirect Plasma and Chemical System Used for the Removal of NOx from Boiler Emission*, IEEE Transactions on Industry Applications*, Vol. 46, No. 5, pp. 1707-1714 (2010.9).
63. H. Fujishima, A. Tatsumi, T. Kuroki, A. Tanaka, K. Otsuka, T. Yamamoto, and M. Okubo, Improvement in NOx Removal Performance of the Pilot-Scale Boiler Emission Control System Using an Indirect Plasma Chemical Process*, IEEE Transactions on Industry Applications*, Vol. 46, No. 5, pp. 1722-1729 (2010.9).
64. M. Okubo, M. Tahara, Y. Aburatani, T. Kuroki, and T. Hibino, Preparation of PTFE Film with Adhesive Surface Treated by Atmospheric-Pressure Nonthermal Plasma Graft Polymerization, *IEEE Transactions on Industry Applications*, Vol. 46, No. 5, pp. 1715-1721 (2010.9).
65. M. Okubo, T. Kuroki, K. Yoshida, and T. Yamamoto, Single-Stage Simultaneous Reduction of Diesel Particulate and NOx Using Oxygen-Lean Nonthermal Plasma Application, *IEEE Transactions on Industry Applications*, Vol. 46, No. 6, pp. 2143-2150 (2010.11).
66. A. Mihalcioiu, K. Yoshida, M. Okubo, T. Kuroki, and T. Yamamoto, Design Factors for NOx Reduction in Nitrogen Plasma, *IEEE Transactions on Industry Applications*, Vol. 46, Vol. 6, pp. 2151-2156 (2010.11).

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Nonthermal Plasma Desorption of Toluene, *IEEE Transactions on Industry Applications*, Vol. 45, No. 1, pp. 10-15 (2009.1).

68. Y. Shimazaki, M. Okubo, T. Yamamoto, and A. Yoshida, Three-Dimensional Numerical Simulation of Nanoparticle Inhalation and Indoor Pollution around Breathing Human, *Journal of Environment and Engineering, JSME Electric Journal*, Vol. 4, No. 1, pp. 145-161 (2009.1).
69. K. Yoshida, B. S. Rajanikanth, and M. Okubo, NOx Reduction and Desorption Studies under Electric Discharge Plasma in Simulated Gas Mixture: a Case Study on Effect of Corona Electrodes, *Plasma Science and Technology, Institute of Physics and IOP Publishing Limited*, Vol. 11, No. 3, pp. 327-333 (2009.6).
70. K. Yoshida, M. Okubo, T. Kuroki, and T. Yamamoto, NOx Reduction in Diesel Engine Emission Using Adsorption Followed by Nonthermal Plasma Process: Performances of Three Types of Plasma Reactors, *International Journal of Emerging Multidisciplinary Fluid Sciences*, Vol. 1, No. 3, pp. 201-211 (2009.9).
71. G. Prieto, O. Prieto, C.R. Gay, K. Yoshida, T. Kuroki, M. Okubo, and T. Yamamoto, Plasma-Adsorption-Catalysis for the Toluene Destruction Process, *International Journal of Plasma Environmental Science & Technology*, Vol. 3, No. 2, pp. 107-115 (2009.9).
72. M. Okubo, T. Kuroki, S. Kawasaki, K. Yoshida, and T. Yamamoto, Continuous Regeneration of Ceramic Particulate Filter in Stationary Diesel Engine by Nonthermal-Plasma-Induced Ozone Injection, *IEEE Transactions on Industry Applications*, Vol. 45, No. 5, pp. 1568-1574 (2009.9).
73. K. Yoshida, T. Yamamoto, T. Kuroki, and M. Okubo, Pilot-Scale Experiment for Simultaneous Dioxin and NOx Removal from Garbage Incinerator Emissions Using the Pulse Corona Induced Plasma Chemical Process, *Plasma Chemistry and Plasma Processing, Springer*, Vol. 29, No. 5, pp. 373-386 (2009.10).

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74. M. Okubo, N. Arita, T. Kuroki K. Yoshida, and T. Yamamoto, Total Diesel Emission Control Technology Using Ozone Injection and Plasma Desorption, *Plasma Chemistry and Plasma Processing, Springer*, Vol. 28, No. 2, pp. 173-187 (2008.4).
75. K. Yoshida, T. Hibino, N. Saeki, and M. Okubo, Sterilization Device Using Corona Discharge Plasma Jet at Atmospheric Pressure, *Journal of the Institute of Electrostatics Japan*, Vol. 32, No. 2, pp. 90-91 (2008.4) (in Japanese).
76. M. Okubo, N. Saeki, and T. Yamamoto, Development of Functional Sportswear for Controlling Moisture and Odor Prepared by Atmospheric Pressure Nonthermal Plasma Graft Polymerization Induced by RF Glow Discharge, *Journal of Electrostatics, Elsevier*, Vol. 66, No. 7-8, pp. 381-387 (2008.7).
77. M. Okubo, M. Tahara, N. Saeki, and T. Yamamoto, Surface Modification of Fluorocarbon Polymer Films for Improved Adhesion Using Atmospheric-Pressure Nonthermal Plasma Graft-Polymerization, *Thin Solid Films, Elsevier*, Vol. 516, No. 19, pp. 6592-6597 (2008.8).
78. M. Okubo, M. Tahara, T. Kuroki, T. Hibino, and N. Saeki, Plating Technology for Fluorocarbon Polymer Films Using Atmospheric-Pressure Nonthermal Plasma Graft Polymerization, *Journal of Photopolymer Science and Technology*, Vol. 21, No. 2, pp. 219-224 (2008.8).
79. T. Kuroki, H. Fujishima, K. Otsuka, T. Ito, M. Okubo, T. Yamamoto, and K. Yoshida, Continuous Operation of Commercial-Scale Plasma-Chemical Aftertreatment System of Smoke Tube Boiler Emission with Oxidation Reduction Potential and pH Control, *Thin Solid Films, Elsevier*, Vol. 516, No. 19, pp. 6704-6709 (2008.8).
80. M. Okubo, K. Yoshida, and T. Yamamoto, Numerical and Experimental Analysis of Nanosecond Pulse Dielectric Barrier Discharge-Induced Nonthermal Plasma for Pollution Control, *IEEE Transactions on*

Industry Applications, Vol. 44, No. 5, pp. 1410-1417 (2008.9).

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21. M. Okubo et al., Thin Film Coating Technology and Measures Against Drying Problems, Technical Information Institute Co., Ltd., Chapter 3, Section 2 About Atmospheric Pressure Plasma Processing, pp. 113-116, p. 117 (2013.8) (in Japanese).
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2. M. Okubo, Energy-Saving Clean Glass Melting System Symposium (Kansai Branch Report), *J. Institute of Electrostatics Japan*, 44 (1), p. 33 (2020.1) (in Japanese).
3. M. Okubo, Production of Adhesive Fluoroplastic by Atmospheric Pressure Plasma Composite Treatment

(Special Issue: Latest Trends in Surface Hydrophilic Treatment Using Plasma), *J. Institute of Electrostatics Japan*, 44 (3), pp. 101-105 (2020.5) (in Japanese).

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6. M. Okubo, T. Kuroki, H. Fujishima, and H. Yamamoto, Basics of Plasma Hybrid Exhaust Gas Treatment Technology and Industrial Application (Exhaust Cleaning of Industrial Boilers and Glass Melting Furnaces), *Clean Technology*, Japan Industrial Publishing Co., Ltd., 28 (3), pp. 4-9 (2018.3) (in Japanese).
7. M. Okubo, Innovation of Environmental Technology by Combined Plasma Processing (Environmental Conservation Laboratory, Department of Mechanical Engineering, Graduate School of Engineering, Osaka Prefecture University), *Clean Technology*, Japan Industrial Publishing Co., Ltd., 28 (4), pp. 71-74 (2018.4) (in Japanese).
8. M. Okubo, Environmental Plasma Research and 20 Years of History (Introduction), *J. Institute of Electrostatics Japan*, 42 (4), p. 149 (2018.7) (in Japanese).

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24. M. Okubo, Received the Environmental Engineering Division Achievement Award, the Japan Society of Mechanical Engineers, *Environmental Engineering Division News, Environment and the Earth: Creation of Amenity Space*, No.25 (2014.4) (in Japanese).
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54. T. Kuroki and M. Okubo, T. Yamamoto, Environmental Cleaning Technology Using Plasma Desorption

(Toluene Concentration Technology Using Honeycomb Adsorbent and Plasma Desorption), *Clean Technology*, Japan Industrial Publishing Co., Ltd., 16-9, pp. 9-12 (2006.9) (in Japanese).

55. T. Kuroki, K. Yoshida, M. Okubo, and T. Yamamoto, Decomposition of Harmful Substances in Wastewater by Gas-Liquid Interfacial Plasma, *Kankyo Jyoka Gijyutsu (Environmental Cleaning Technology)*, 5-11, pp. 53-56 (2006.11) (in Japanese).

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Major Activities in Societies and Committees

[IEEE]

2019.11 - present	Award subcomittee member of EPC (Electrostatic Processes Committee)
2015.10 - 2018.10	Chairman of EPC (Electrostatic Processes Committee)
2016.5 – present	Senior member of EPC (Electrostatic Processes Committee)
2013.10 - 2015.9	Vice-chairman of EPC (Electrostatic Processes Committee)
2011.10 - 2013.9	Assistant secretary of EPC (Electrostatic Processes Committee)
2006.4 - present	Associate editor of IEEE Transactions on Industry Applications
2002.4 - present	Member of IEEE Industry Application Society, Electrostatic Processes Committee
2001.4 - present	Member of IEEE (the Institute of Electrical and Electrics Engineers)

[Japan Society of Mechanical Engineers, JSME]

2013.4 - 2014.3	Chief Secretary for Students of Kansai Division
2012.4 - present	JSME Fellow
2010.4 - 2012.4	Chairman of Third Technical Committee of Environmental division
2009.4 - 2011.3	Councilor and Barrister of JSME
2009.4 - 2010.3	Committee Member of International Workshop of Environmental Engineering
2009.4 - 2012.3	Assigned paper reviewer Committee of JSME journal

2007.4 - 2010.4	Technical Committee Member of Environmental Engineering division
2007.4 - 2008.3	President of Environmental division
2007.4 - 2008.4	Chairman of Symposium of Environmental Division
2006.4 - 2007.3	Vice President of Environmental Division
2005.4 - 2007.3	Assigned paper reviewer Committee of JSME Journal
2005.4- present	Member of third Technical Committee of Environmental Division

[Institute of Electrostatic Society of Japan, ISEJ]

2009.4 - present	Regional director of IESJ
2004.9 - 2006.8	Secretary of Committee of plasma hybrid processes for the application of energy utilization.
2001.9 - 2004.8	Secretary of Committee IEJ Electrostatics Society of Japan (Plasma Application of Surface Treatment and Environmental Protection)
1999.4 - present	Member of Electrostatic Society of Japan

[Other Activities]

2020.8-present	Plasma, MDPI, Editorial Board Member
2017.4 - present	Technical adviser of Nihon Yamamura Glass Co. Ltd.
2015.7- present	Journal of Electrostatics, Elsevier, Editorial Board Member
2009.11 - 11.11	Reviewers for Research Projects of Kinki METI (Regional Innovation Program)
2009.11 -2009.3	Reviewer for Promotion to a Professorship, Department of Electrical Communication Engineering, Indian Institute of Science
2008.12 -2009.3	Technical adviser of Pearl Kogyo Co. Ltd.
2006.4 - 2007.3	Invited Editorial Board of Journal of Japan Society of Aerosol Science and Technology
2006.4 - 2007.3	Invited Editor of Journal of Japan Association of Aerosol Science & Technology
2006.5 - 2008.5	Technical Committee Member of New Energy and Industry Technology Development Organization, Committee of Innovative next-generation automobile with low emission.
2005.5 - 2006.3	Technical adviser of Shinohara Denki Co. Ltd.
2005.6 - 2006.3	Technical adviser of Oden Co. Ltd.
2005.4.1 - 2006.3.31	Executive Member of Annual symposium of Aerosol Science and Technology
2003.9 - 2005.1	Executive Committee member of Council for Science and Technology, Ministry of Educations, Culture, Sports, Science and Technology, Japan.

Outstanding Achievements

[Papers, books, and publications that received high social recognition]

The applicant has written many papers and books on plasma environmental pollution control, which received high social recognition. For example, the co-authored book “Advanced Physicochemical Treatment Technologies,” Humana Press, Springer, USA, 2006 and “Advanced Air and Noise Pollution Control,” Humana Press, Springer, USA, 2005, and “New Technologies for Emission Control in Marine Diesel Engines,” Butterworth-Heinemann, Elsevier, 2019 are being used as a textbook in domestic and overseas universities.

[Invention or development of technology/products that had high social recognition]

The Plasma Hybrid Clean (TM) boiler and the bio-clean boiler shown in **Fig. 1** invented by the applicant and his colleagues were developed by the collaboration of the industry, university, and government, which was led by the applicant. These products became a commercial reality in April 2011. The NO_x emissions of these products were reduced to below 1 ppm, which made these products environment friendly. This was even published in the newspaper, which demonstrated a high social recognition of the developed technology and products. The patent registration number for the method and device for processing exhaust gas is 4472638, and the inventors are Toshiaki Yamamoto, Tomoyuki Kuroki, and Masaaki Okubo. There are four other patents that are either applied for or under examination (patent application numbers: 2005-217285, 2007-041449, 2009-117734, and 2009-140239)

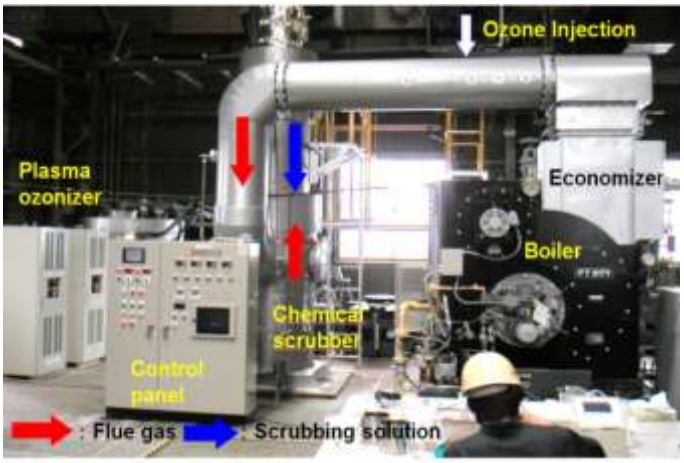

Fig. 1 Commercialized product of plasma hybrid clean bio-fuel combustion boiler

Main Newspaper Articles

1. Masaaki Okubo and Tomoyuki Kuroki, “Exhaust gas treatment of glass melting furnaces, dry and environmentally compliant, Osaka Prefecture University,” Nikkan Kogyo Newspaper, 1st page, March 5, 2018.
2. Keiichi Otsuka and Masaaki Okubo, “Takao Iron Works, realizing low NOx using plasma, develops a boiler and biomass utilization machine in collaboration with the Osaka Prefecture University,” the Air-Conditioning Times, page 5, October 12, 2010
3. Masaaki Okubo, “Plasma-purified biomass boiler by Osaka Prefecture University and Takao Iron Works, reducing NO_x emissions to below 1 ppm,” Nikkan Kogyo Newspaper, December 20, 2010

[Considerable achievements for the society]

The applicant led the large-scale JST (Japan Science and Technology Agency) five-years project “Development of plasma combined exhaust gas aftertreatment system for a super clean hybrid diesel engine” (Regional R&D Resources Utilization Program in JST, 2006–2010), which was a collaboration between the industry, university, and government. He succeeded in developing a superclean diesel engine and combustion furnace in collaboration with a local company. **Figure 2** shows a developed full-scale prototype for plasma aftertreatment system for marine diesel engines. In a subsequent third-party evaluation, the project was recognized as a successful model of collaboration between a local university and a local company, which greatly contributed to the collaboration between the industry, university, and government in the Kansai (Osaka) area.

Fig. 2 Full-scale prototype for plasma aftertreatment system for marine diesel engines

[Superclean and energy saving glass melting furnace system]

The applicant assisted as a technical adviser the large-scale NEDO (New Energy and Industrial Technology Development Organization) three-years project “Development of super clean and energy saving glass melting furnace system” (Strategic Innovation Program for Energy Conservation Technologies Program in NEDO, 2017–2020), which is a collaboration between the industry, university, and government. He succeeded in developing a superclean and energy saving glass melting furnace system in collaboration with a company. The project contributes to the collaboration between the industry, university, and government in the Kansai (Osaka) area.