

Intense Attosecond Pulse Research Team

Publications (Original Paper)

1. Y. Nabekawa, T. Shimizu, Y. Furukawa, E. J. Takahashi, K. Midorikawa: "Interferometry of an attosecond pulse train generated from Xe gas target", *Chem. Phys.* **414**, 20-25 (2013).
2. Y. Liao, Y. Shen, L. Qiao, D. Chen, Y. Cheng, K. Sugioka, and K. Midorikawa, "Femtosecond laser nanostructuring in porous glass with sub-50nm feature sizes", *Opt. Lett.* **38**, 187-189 (2013).
3. Y. Liao, Y. Cheng, C. Liu, J. Song, F. Hei, Y. Shen, D. Chen, Z. Xu, Z. Fan, X. Wei, K. Sugioka, and K. Midorikawa, "Direct laser writing of sub-50 nm nanofluidic channels buried in glass for three-dimensional micro-nanofluidic integration", *Lab. Chip.* **13**, 1626-1631 (2013).
4. S. Nakashima, K. Sugioka, K. Midorikawa, and Mukai, "Spatially selective modification of optical and magneto-optical properties in Fe- and Au-doped glasses irradiated with femtosecond-laser", *Appl. Phys.* **A110**, 765-769 (2013).
5. Zhihai Wang, Koji Ishibashi, S. Komiyama, Mikhail Patrashin, and Iwao Hosako, "Charge sensitive infrared photo transistors with integrated plasmonic photocouplers", *Journal of Physics D: Applied Physics*, **46**, 165107 (2013)
6. H. Ohmori: "Effect of nanodiamond on ultraprecision machining process", *Proceedings of CJUMP Symposium*, Mar.(2013).
7. C. Liu, Y. Liao, F. He, Y. Shen, D. Chen, Y. Cheng, Z. Xu, K. Sugioka, and K. Midorikawa, "Fabrication of three-dimensional microfluidic channels inside glass using nanosecond laser direct writing", *Opt. Express*, **20**, 4291-4296 (2012).
8. J. X. Song, Y. Liao, C. N. Liu, D. Lin, L. L. Qiao, Y. Cheng, K. Sugioka, K. Midorikawa, S. Zhang, "Fabrication of gold microelectrodes on a glass substrate by femtosecond-laser-assisted electroless plating", *J. Laser Micro/Nanoengin.* **7**, 334-338 (2012).
9. S. Nakashima, K. Sugioka, K. Tanaka, M. Shimizu, Y. Shimotsuma, K. Miura, K. Midorikawa, and Mukai, "Plasmonically enhanced Faraday effect in metal and ferrite nanoparticles composite precipitated inside glass", *Opt. Express* **20**, 28191-28199 (2012).
10. S. Wu, D. Wu, J. Xu, Y. Hanada, R. Sukanuma, H. Wang, T. Makimura, K. Sugioka, and K. Midorikawa, "Characterization and mechanism of glass microwelding by double-pulse ultrafast laser irradiation", *Opt. Express* **20**, 28893-28905 (2012).
11. M. Nakasuji, A. Tokimasa, T. Harada, Y. Nagata, T. Watanabe, K. Midorikawa, and H. Kinoshita: "Development of Coherent Extreme-Ultraviolet Scatterometry Microscope with High-Order Harmonic Generation Source for Extreme-Ultraviolet Mask Inspection and Metrology", *Jpn. J. Appl. Phys.* Vol.51, 06FB09 pp.1-6 (2012).
12. H. Ohmori: "A Study on Characteristics of ELID Lapping for Sapphire Wafer Material", *Journal of the Korean Society for Precision Engineering*, Oct.(2012).
13. S. Beke, L. Körösi, K. Sugioka, and K. Midorikawa: "Fabrication of Transparent and Conductive Microdevices", *J. Laser Micro/Nanoengin.* **7**, 28-32 (2012).
14. Y. Hanada, K. Sugioka, and K. Midorikawa: "High sensitive optofluidic chips for biochemical liquid assay fabricated by femtosecond laser 3D micromachining followed by polymer coating", *Lab. Chip.* **12**, 3688-3693 (2012).
15. S. Nakashima, K. Sugioka, K. Midorikawa and K. Mukai: "Effect of femtosecond-laser irradiation on magnetic and optical properties in Au- and Fe-doped transparent glass", *J. Laser Micro/Nanoengin.* **7**, 212-216 (2012).
16. P. Lan, E. J. Takahashi, K. Midorikawa: "Rotation-free holographic imaging with extended arc reference", *Opt. Express* **20**, 6669 (2012).
17. P. Lan, E. J. Takahashi, K. Midorikawa: "Efficient control of electron localization by subcycle waveform synthesis", *Phys. Rev. A* **86**, 013418 (2012).
18. Y. Furukawa, Y. Nabekawa, T. Okino, A. Amani Eilanlou, E. J. Takahashi, P. Lan, K. L. Ishikawa, T.

- Sato, K. Yamanouchi, and K. Midorikawa: "Resolving vibrational wave-packet dynamics of D_2^+ using multicolor probe pulses", *Opt. Lett.* **37**(14), 2922-2924 (2012).
19. K. Isobe, H. Kawano, T. Takeda, A. Suda, A. Kumagai, H. Mizuno, A. Miyawaki, and K. Midorikawa: "Background-free deep imaging by spatial overlap modulation nonlinear optical microscopy," *Biomed. Opt. Express*, **3**, 1594-1608 (2012).
 20. Z. Wang, K. Ishibashi, S. Komiyama, N. Nagai, and K. Hirakawa, "Integrating a plasmonic coupler to photo detector of Terahertz frequency", *Appl. Phys. Lett.* **101**, 091114 (3 pages) (2012).
 21. S. Kunimura and H. Ohmori: "Mirror surface finishing of plastics using ELID grinding with a conductive rubber bonded abrasive wheel", *International state-of-the-art on nanoManufacturing*, 113-116 (2012).
 22. A. Amani Eilanlou, K. Ishikawa, Y. Nabekawa, H. Takahashi, and K. Midorikawa: "Simulation of intense isolated attosecond pulse generation with a two-color laser field", *IEEJ Transactions on Electronics, Information and Systems*, **132**(8), 1265-1272 (2012).
 23. Y. Kojima, A. Amani Eilanlou, Y. Furukawa, Y. Nabekawa, E. J. Takahashi, F. Kannari, and K. Midorikawa: "Material survey for a novel beam splitter separating high-order harmonics from high-average-power fundamental pulses", *Jpn. J. Appl. Phys.*, **51**, 062601/1-6 (2012).

Books, Reviews

1. H. Ohmori: "Electrolytic in-process dressing grinding and polishing", *Tribology of Abrasive Machining Process*, pp. 364-398 (2013).
2. K. Sugioka, "Microstructuring of Photosensitive Glass", G. Cerullo and R. Osellame (Eds.), *Femtosecond laser micromachining: photonic and microfluidic devices in transparent materials*, (Springer, Berlin, 2012) p. 421-441.
3. 杉岡幸次, "フェムト秒レーザーによる微小流体光学素子の作製", *レーザー研究*, **40**, 919-925 (2012).
 1. K. Sugioka and Y. Cheng: "A tutorial on optics for ultrafast laser materials processing: basic microprocessing system to beam shaping and advanced focusing methods", *Adv. Opt. Technol.* (2012). in press.
 2. K. Midorikawa: "Multiphoton Processes and Attosecond Physics", *Springer Proceedings in Physics 125: Multiphoton Processes and Attosecond Physics*, (2012).
 3. K. Midorikawa: "X-ray and EUV sources", *Handbook of Lasers and Optics*, 907-916 (2012).
 4. K. Ishibashi: "Nanoelectronics" (pp451-480) in "Nanofabrication Handbook" edited by Stefano Cabrini and Satoshi Kawata (CRC Press, Florida, 2012)
 5. K. Sugioka and Y. Cheng: "Femtosecond laser processing for optofluidic fabrication", *Lab. Chip.* **12**, 3576-3589 (2012).
 6. 杉岡幸次: "2.7 レーザ加工分野の市場動向: 2.7.1 はじめに", *光産業の動向 ((財)光産業技術振興協会編)* 196-202 (2012).
 7. 杉岡幸次: "2.7 レーザ加工分野の市場動向: 2.7.3 おわりに", *光産業の動向 ((財)光産業技術振興協会編)* 230-231 (2012).
 8. 高橋栄治、鍋川康夫、緑川克美: "高次高調波による XUV 極短パルス光源の短波長化", *光技術コンタクト*, 日本オプトメカトロニクス協会, **50**(5), 23-31 (2012).
 9. 磯部圭佑、緑川克美: "深部超解像イメージングのための非線形光学顕微鏡", *Oplus E*, **34**, 870-875 (2012).
 10. 尾上順 編著、大澤映二、松尾豊、高井和之、榎木敏明、石橋幸治、本間芳和 共著 *ナノ学会編シリーズ: 未来を創るナノ・サイエンス&テクノロジー第1巻「ナノカーボン 炭素材料の基礎と応用」* (近代科学社、2012)

Invited Talk

1. H. Ohmori: "The UltraFabrication: ELID Grinding Technologies", The 9th Cooperative and Joint international conference on Ultra-precision Machining Process, in conjunction with The 7th Conference of Ultra-Precision (ELID) Technology Research Group, Jeju, Korea, March, 2013
2. K. Sugioka, S. Wu, and K. Midorikawa: "Double-pulse irradiation of ultrafast laser for high-efficiency glass microwelding", SPIE Int. Symp. on Laser Applications in Microelectronic and Optoelectronic Manufacturing XVIII (LAMOM XVIII), San Francisco, USA, Feb. (2013).
3. K. Ishibashi, A. Hida: "Optical emission and control in carbon nanotube quantum dots", The Sweden-Japan Workshop on Quantum Nano-Physics and Electronics (QNANO2013), Tokyo, Japan, Jan. 13-14(2013).
4. E. J. Takahashi P. Lan, and K. Midorikawa: "Energy scaling of isolated attosecond pulses", The 7th Asian Symposium on Intense Laser Science (ASILS7), Tokyo, Japan, Nov. (2012).
5. E. J. Takahashi: "Gigawatt-scale isolate attosecond pulses by high-order harmonic", 10th Asian International Seminar on Atomic and Molecular Physics, Taipei, Taiwan, Oct. (2012).
6. Y. Cheng, Z. Z. Xu, K. Sugioka, and K. Midorikawa, "Construction of microfluidic biochips with enhanced functionalities using 3D femtosecond laser direct writing", 20th Int. Conf. on Advanced Laser Technology (ALT' 12), Thun, Switzerland, Sept. (2012).
7. Y. Cheng, Y. Liao, Z. Z. Xu, K. Sugioka, and K. Midorikawa, "Femtosecond laser direct writing of 3D micro- and nanofluidics for bio-applications", 73rd Japan Society of Applied Physics Fall Meeting (International Symposium), Matsuyama, Japan, Sept. (2012).
8. Y. Cheng, Y. Liao, J. Song, Y. Shen, D. Chen, Zhizhan Xu, K. Sugioka, and K. Midorikawa, "Fabrication of integrated micro-nanofluidics embedded in glass with sub-50nm feature sizes", 2nd International Forum on Trends in Nano-Manufacturing, Suzhou, China, Sept. (2012).
9. 永田 豊、原田哲男、木下博雄、緑川克美: " コヒーレントスキャトロメトリー顕微鏡用光源としての13.5nm高次高調波発生システムの開発 "、レーザー学会学術研究会第33回年次大会、姫路、1月(2013)。
10. 杉岡幸次, " レーザー加工分野の最新動向 ", 浜松光技術活用研究会、12月、浜松(2012)。
11. 杉岡幸次, " レーザ加工分野の最新動向 ", 平成24年光産業技術振興協会光産業動向セミナー、9月、東京(2012)。
12. 杉岡幸次, " 超短パルスレーザーによるガラスの3次元加工 ", 日本光学会光設計研究グループ研究会「光と新しい加工技術」, 11月、東京(2012)。
13. 杉岡幸次, " フェムト秒レーザー3次元加工技術とその応用 ", レーザーシステムズセミナー、11月、札幌(2012)。
14. 杉岡幸次, " レーザー加工の産業動向 ", レーザーシステムズセミナー、11月、札幌(2012)。
15. 杉岡幸次, " フェムト秒レーザー3次元加工とバイオチップ作製への応用 ", 第57回宇都宮大学オプティクス教育研究セミナー、11月、宇都宮(2012)。
16. K. Ishibashi: "Carbon nanotube quantum dots for terahertz detection", Symposium L on Group 4 Photonics for Sensing and Imaging, 2012 MRS (Material Research Society) Spring Meeting, San Francisco, USA, Apr. (2012).
17. H. Ohmori: "Effect and Applications of Nanodiamond in Nanoprecision Machining", 2012 MRS Spring Meeting, San Francisco, USA, Apr. (2012).
18. H. Ohmori: "ELID, Micro and Ultra Fabrication Technologies", The 2nd International Conference on Frontiers of Plasmonics, Chengdu, China, Apr. (2012).
19. H. Ohmori: "Nanoprecision Micro-Structural Ultra Fabrication Technologies and Surface Functionalization", The 2nd International Symposium on Micro/Nano Mechanical Machining, Matsushima, Japan, Apr. (2012).
20. K. Midorikawa: "Recent progress on high harmonic generation and application at RIKEN", The 3rd Shanghai -Tokyo Advanced Research Symposium on Ultrafast Intense Laser Science (STAR3)", Odawara, Japan, May (2012).
21. K. Sugioka, and K. Midorikawa: "3D integration of functions inside glass by ultrafast laser", The 3rd Shanghai-Tokyo Advanced Research Symposium on Ultrafast Intense Laser Science (STAR3), Odawara,

Japan, May (2012).

22. H. Ohmori: "Current Status of R&D Activities on Microfabrication in RIKEN Group for Critical Component Development", The 6th MIRAI workshop, San Francisco, USA, May (2012).
23. K. Sugioka, K. Midorikawa, Y. Cheng, and Z. Xu: "High-performance laser processing using manipulated ultrashort pulses", 2012 Int. Conf. on High-Power Laser Ablation (HPLA 2012), Santa Fe, USA, May (2012).
24. H. Ohmori: "NANO-ELID Micro and UltraFabrication Technologies", Ultra-Precision Machining and Optic Lens Manufacturing Technology, Seoul, Korea, June (2012).
25. K. L. Ishikawa: "Attosecond and femtosecond photoionization dynamics of He", the joint workshop of the 5th Asian Workshop on Generation and Application of Coherent XUV and X-ray Radiation (5th AWCXR) and the ISSP International Workshop on Coherent Soft X-ray Sciences, Kashiwa, Japan, June (2012)
26. K. Sugioka, Y. Hanada, H. Kawano, I. S. Ishikawa, A. Miyawaki, and K. Midorikawa: "Femtosecond laser 3D micromachining for optofluidics fabrication", The 8th International Conference on Photo-Excited Processes and Applications (ICPEPA-8), Rochester, USA, Aug. (2012).
27. K. Midorikawa: "Generation of intense isolated attosecond pulses", The Workshop on Super Intense Laser-Atom Physics (SILAP 2012), Suzhou, China, Sept. (2012).
28. K. Sugioka: "Femtosecond laser 3D micromachining for optofluidics fabrication", Optofluidics 2012, Suzhou, China, Sept. (2012). **Plenary**
29. Y. Cheng, Z. Z. Xu, K. Sugioka, and K. Midorikawa: "Construction of microfluidic biochips with enhanced functionalities using 3D femtosecond laser direct writing", 20th Int. Conf. on Advanced Laser Technology (ALT' 12), Thun, Switzerland, Sept. (2012).
30. Y. Nagata, T. Harada, M. Nakasuji, H. Kinoshita, and K. Midorikawa: "Development of highly spatial-coherent, 13.5-nm high-order harmonics for EUVL mask inspection using Coherent EUV Scatterometry Microscope", IEEE Photonics Conference 2012, California, USA, Sept. (2012).
31. 杉岡幸次: "レーザー加工の基礎", レーザーEXPO 2012 レーザー特別セミナー、横浜、4月 (2012).
32. 杉岡幸次: "超短パルスレーザー加工", レーザーEXPO 2012 レーザー特別セミナー、横浜、4月(2012).
33. 杉岡幸次: "レーザーマイクロ・ナノ加工の基礎と最前線", 日本テクノセンターセミナー、東京、5月(2012).
34. 杉岡幸次: "レーザ加工の産業動向", 光産業技術振興協会平成24年度第2回多元技術融合光プロセス研究会、東京、8月(2012).
35. 磯部圭佑: "時空間制御した非線形光学顕微分光法", フォトニック信号処理セミナー、淡路、8月 (2012).
36. 杉岡幸次: "レーザ加工分野の最新動向", 平成24年光産業技術振興協会光産業動向セミナー、東京、9月(2012).
37. 緑川 克美: "高次高調波による分子科学", 第6回分子科学討論会、東京、9月 (2012).
38. 高橋栄治: "ギガワット級単一アト秒パルス光源の開発と非線形光学研究への展開", 第73回応用物理学会学術講演会、松山、9月(2012).

Conferences

1. The 31st Microfabrication Symposium & the 6th Conference on Ultra-Precision (ELID) Technology, Oct.31-Nov.2 (2012).
2. The 9th Cooperative and Joint International Conference on Ultra-precision Machining Process, in conjunction with The 7th Conference of Ultra-precision (ELID) Technology Research Group, Mar.27-30 (2013).
3. Organizing Committee Chair, 2012 International Workshop on Innovative Nanoscale Devices and

Systems (WINDS), Hawaii, USA, Dec.2-7 (2012).

4. 第5回 文部科学省「最先端の光の創成を目指したネットワーク研究拠点プログラム」シンポジウム、東京、1月11日(2013).
5. Advanced Lasers and Photon Sources 2012 (ALPS'12), Yokohama, Japan, April 26-27 (2012).
6. 13th International Symposium on Laser Precision Microfabrication (LPM 2012), Washington DC, USA, June 12-15 (2012).
7. The Third International Conference on nanoManufacturing 2012, Tokyo-Wako, Japan, July 25-27 (2012).

Awards

1. 磯部圭佑：“レーザー学会第32回年次大会優秀論文発表賞”、一般社団法人レーザー学会、2012年5月31日。
2. 永田豊：“レーザー学会 奨励賞”、一般社団法人レーザー学会、2012年5月31日。
3. Y. Hanada, K. Sugioka, and K. Midorikawa: “High sensitive concentration analysis of fluids using optofluidic chip fabricated by femtosecond laser direct writing followed by low refractive index polymer”, Optofluidics 2012 The Best Paper Award, Sept.15 (2012).

News, Reviews

1. プレスリリース“生体試料の深部観察を可能にする光学顕微鏡の新技术「SPOMNOM」を開発 - 揺らぎの有るレーザーと無いレーザーを用いて、観察可能な深さの限界を突破 - ”、2012年5月29日