

EOS Conference on Laser Ablation and Nanoparticle Generation in Liquids 2010

(ANGEL 2010)

**Engelberg, Switzerland
29 June – 1 July 2010**

ISBN: 978-1-61738-960-3

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2010) by the European Optical Society
All rights reserved.

Printed by Curran Associates, Inc. (2010)

For permission requests, please contact the European Optical Society
at the address below.

European Optical Society
c/o Laser Zentrum Hannover
Hollerithallee 8
30419 Hannover Germany

Phone: +49-511-2788-115
Fax: +49-511-2788-119

www.myeos.org/about

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

BIO APPLICATIONS

Chairs: Fumitaka Mafune, Tsuyoshi Asahi

Femtosecond Laser Interaction with Plasmonic Nanostructures in Liquids: Modeling and Application to Biology	1
<i>M. Meunier, E. Boulais, R. Lachain, J. Baumgart</i>	
Femtosecond Laser Ejection of Gold Nanoprisms Fabricated by Nanosphere Lithography into Liquid Media	2
<i>Wei (David) Qian, Christopher Tabor, Wenyu Huang, Mostafa El-Sayed</i>	
Modeling and Enhancement of Photothermal and Photoacoustic Properties of Absorbing Nanoparticles	4
<i>V. Pustovalov, L. Astafyeva, E. Galanzha, V. Zharov</i>	
Gold Nanobioconjugates by Fast Ex-Situ Functionalization Using Nanosecond Laser Ablation in Liquid Flow	5
<i>C. Sajti, A. Barchanski, S. Barcikowski</i>	
Toxicity of Gold Nanoparticles Produced by Laser Ablation in Liquids on Somatic Cells, Spermatozoa and Embryos	6
<i>U. Taylor, S. Petersen, A. Barchanski, W. Garrels, S. Klein, W. Kues, S. Barcikowski, D. Rath</i>	

POST IRRADIATION

Chairs: Wei (David) Qian, Georgy Shafeev

Tailoring of Organic Nanoparticle Colloids by Laser Ablation in Water	8
<i>Tsuyoshi Asahi</i>	
Laser-induced Fragmentative Decomposition of Fine CuO Powders in Acetone: A Highly Productive Pathway to Cu and Cu₂O Nanoparticles	9
<i>M. Kawasaki, N. Nishimura</i>	
Fragmentation of Differently Capped Au Nanoparticles by 532 and 355 nm PS Laser Irradiation: Experimental Analysis and Theoretical Modelling	10
<i>E. Giorgetti, F. Giammanco, P. Marsili, A. Giusti</i>	
Pulsed-Laser Induced Electron Dynamics Relevant to Spontaneous Splitting and Lattice Heating of Gold Nanoparticles in Solution	12
<i>Daniel Werner, Shuichi Hashimoto, Takayuki Uwada</i>	
Metallic Nanoparticles in Liquids As the Target for Laser Initiation of Nuclear Reactions	14
<i>G. Shafeev</i>	
Laser Synthesis and Manipulation of Nanomaterials	15
<i>F. Mafune</i>	
Laser-induced Selective Modification of Core/Shell Colloids	16
<i>Ivano Alessandri, Laura Depero</i>	
Long Term Stability of Uncapped AuNPs Obtained by PS Laser Ablation in Different Solvents: Wavelength and Concentration Dependence	17
<i>E. Giorgetti, F. Giammanco, P. Marsili, A. Rindi, R. Gutierrez, I. Moggio, Eduardo Arias</i>	

CAVITATION BUBBLE & PLASMA DYNAMICS

Chairs: Takeshi Tsuji, Mikolai Tarasenko

Formation of Nanoparticles in the Laser-induced Cavitation Bubble	19
<i>A. Menendez-Manjon, S. Barcikowski</i>	
Underwater Production of Nano Particles by 1064 nm Laser Ablation on Gold and Silver Targets	21
<i>T. Kovalchuk, G. Toker, V. Bulatov, I. Schechter</i>	
Enhancing Ablation Efficiency in Liquids: Bypassing the Cavitation Bubble	22
<i>P. Wagener, A. Schwenke, S. Barcikowski</i>	
Induced Plasma Produced by Laser-metal Interaction in Bulk Water	24
<i>A. De Giacomo, G. Colonna, M. Dell'Aglio, O. De Pascale, R. Gaudio, F. Taccogna</i>	
Modeling of Nanoparticle Formation by Laser Ablation in Liquids	25
<i>T. Itina, G. Ledoux, D. Amans, C. Dujardin</i>	

ALLOY NANOPARTICLES

Chairs: Georgy Shafeev, Philipp Wagener

Laser Tailoring of Nanoparticles	26
<i>Karl Kleinermanns</i>	
Laser Fabrication and Modification of Compound Nanoparticles in Liquids	28
<i>N. Tarasenko, A. Butsen, M. Nedelko</i>	
Femtosecond Laser Processing of Nanomaterials in Liquids for Biomedical Applications	29
<i>M. Meunier, S. Besner, P. Boyer, J-P. Sylvestre</i>	

APPLICATIONS & SCALE-UP

Chairs: Heinrich Hofmann, Vincenzo Amendola

Plasmonic Characterization and Photonic Applications of Noble Metal Nanoparticles Obtained by LASiS	30
<i>V. Amendola, M. Meneghetti</i>	
Nanocomposites for Bioactive Medical Devices: Fabrication and Testing	32
<i>P. Wagener, A. Schwenke, S. Barcikowski</i>	
Ablation in a Flow-chamber for Continuous Nanoparticle Generation	33
<i>T. Salminen, T. Niemi</i>	
Scale-up of Corundum Nanoparticle Productivity During Laser Ablation in Liquid	34
<i>Ramin Sattari, Ata Orneker, C. Sajti, P. Wagener, S. Barcikowski</i>	

POSTER SESSION

Poly (3-alkylthiophene) and Modified Carbon Nanotube Composites for Photovoltaic Applications	35
<i>Mohammad Karim</i>	
A Novel Route for the Synthesis of CdS Nanostructures by Irradiation of 10 MeV Electron Beam Onto Cd²⁺- DMP Aqueous Solution	37
<i>D. Yoo, S. Ha, I. Kim, J. Lee, M. Choo, G. Kim, E. Lee, B. Lee</i>	
Laser Ablation of Graphite in Liquids: Formation of Polyynes	38
<i>Seung Shin, S. Ha, Jae Song, Seung Park</i>	
Surface Enhanced Raman Scattering from Copper Nanoparticles Obtained by Laser Ablation	39
<i>M. Muniz-Miranda, C. Gellini, E. Giorgetti</i>	
Wurtzite-type ZnO Nanoparticles by PLAL	40
<i>B. Lin, P. Shen, S. Chen</i>	
Modeling of Nano Core (Ag)-shell (Au) Generation in Distilled Water Based on Laser Ablation	42
<i>Hamid Dehghanpour, P. Parvin</i>	
Fabrication of Pd Nano Spheres in Water by Q-switched Nd: YAG Laser	43
<i>S. Mortazavi, P. Parvin, A. Golikand, S. Alipour, S. Keshmiri</i>	
Nano Core(Ag)-shell(SiO₂) Generation Base on Single Stage Laser Ablation	45
<i>S. Keshmiri, P. Parvin, S. Alipour, S. Mortazavi</i>	
Modeling of the Processes of Laser-nanoparticle Interaction	46
<i>V. Pustovalov</i>	
Growth of ZnS Nanoparticles in Water Using Liquid Phase Pulsed Laser Ablation Technique	47
<i>P. Aneesh, R. Sreeja, M. Jayaraj</i>	
PLA of Ag and Cu for Antibacterial and Antifungal Composite Applications	48
<i>A. Irajizad, S. Mahdavi, M. Raftari, B. Fattahi, A. Kazemi</i>	
Laser Ablation in Liquid: Colloidal Nanoparticles Synthesis	49
<i>S. Messaoud Aberkane, S. Boudjemai, T. Kerdja</i>	
Diamond-like Carbon Nanoparticles Obtained in Liquid by Short and Ultra-short Laser Pulses	50
<i>A. De Bonis, R. Teghil, A. De Giacomo, R. Gaudiuso, M. Dell'Aglio, G. Senesi, A. Santagata, S. Orlando</i>	
Plasmon-enhanced Optical Trapping of Gold Nano-aggregates Prepared by Laser Ablation in Liquid Environments	51
<i>E. Messina, E. Cavallaro, A. Cacciola, R. Saija, F. Borghese, P. Denti, P. Gucciardi, M. Iati, M. Meneghetti, G. Compagnini, V. Amendola, O. Marago</i>	
Structural and Optical Limiting Properties of Polyynes Prepared by Pulsed Laser Ablation of Graphite in Liquids	52
<i>E. Fazio, S. Patane, F. Neri, L. D'Urso, G. Compagnini</i>	
Synthesis and Characterization of Silicon Nanoparticles by Laser Ablation in DMSO	54
<i>M. Taheri, F. Hajiesmaeilbaigi, A. Motamedi</i>	

ZnO-Au Nanocomposite by Pulsed Laser Irradiation	56
<i>Geetika Bajaj, R. Soni</i>	
Synthesis and Characterization of Gold Nanoparticles in 535-4TB Utilized in Nano Structured Dye Sensitized Solar Cell	57
<i>A. Rad, M. Malekshahi, M. Afzali, M. Bazargan, M. Ghoranneviss</i>	
Optimization of Silver Nanoparticles Laser Synthesis with Emission Spectroscopy of Induced Plasma	58
<i>S. Dadras, P. Jafarkhani, M. Torkamany, J. Sabbaghzadeh, A. Koohian</i>	
Necklace Shaped Au-Ag Nanoalloys: Laser Assisted Synthesis and Nonlinear Optical Properties	59
<i>P. Jafarkhani, S. Dadras, M. Torkamany, J. Sabbaghzadeh, A. Koohian</i>	
Laser Microexplosions of Nanoparticles in Tumor	61
<i>B. Kogan, A. Pankratov, A. Butenin, R. Feyzulova, T. Andreeva, R. Yakubovskaya</i>	
Femtosecond Laser Assisted Formation of Gold Nanoparticles: Influence of CTAB Molecules on Nanoparticle Stability	63
<i>M. Sobhan, M. Withford, E. Goldys</i>	
Gold Nanoparticles Produced by Laser Ablation Onto Ionic Liquids	65
<i>H. dos Santos, S. Teixeira, R. Correia, J. Dupont, M. Andreazza</i>	
Synthesis of Aluminum Oxide Nanoparticles Using Laser Ablation in Liquid	66
<i>Bhupesh Kumar, R. Thareja</i>	
Synthesis of Palladium Nanoparticles by Pulsed Laser Ablation in Water and Their Characterization	67
<i>F. Colao, G. Cristoforetti, A. Dinelli, F. Fabbri, V. Palleschi, E. Pitzalis, A. Ruffoloni, R. Fantoni</i>	
Impact of Spacer Length on Laser-generated Gold Nanomarker Design	68
<i>N. Hashimoto, A. Barchanski, S. Petersen, S. Barcikowski</i>	
Particular Particle Shapes Achieved Through Pulsed Laser Ablation in Liquid	69
<i>C. Chubilleau, V. Kosalathip, B. Lenoir, H. Cao, S. Migot, A. Dauscher</i>	
Preparation of Luminescent and Optical Limiting Silicon Nanostructures by Nanosecond-pulsed Laser Ablation in Liquids	70
<i>E. Fazio, F. Barreca, S. Spadaro, G. Curro, F. Neri</i>	
In-situ Monitoring of Laser Ablation/Nanoparticle Fragmentation Process in Liquid Media	72
<i>P. Smejkal, J. Pflger, B. Vlckova</i>	
Violet Luminescence from ZnO/Poly (ethylene glycol) Colloidal Nanocomposite Prepared by Pulsed Laser Ablation in Liquid Media: Effect of PEG/Water Ratio	74
<i>S. Singh, R. Gopal</i>	
CTAB Assisted Synthesis of Nickel Nanoparticles by Laser Ablation and Its Characterizations	76
<i>M. Singh, A. Agarwal, R. Gopal</i>	
Hexagonal-phase ZnSe Nanoparticles Fabricated by Femtosecond Laser Ablation	77
<i>H. Wang, W. Tang, C. Luo, C. Yang, S. Jian, G. Chen, T. Kobayashi</i>	
Ultra-short Pulsed Laser Generation of Alloy Nanoparticles in Liquid Environment	78
<i>J. Jakobi, A. Hahn, A. Schwenke, P. Wagener, S. Barcikowski</i>	
Nanoparticles Generated by Continuous-wave Fibre Laser Ablation in Liquid: Mechanism and Characteristics	79
<i>S. Khan, Y. Yuan, Z. Liu</i>	
Self-assembly of Gold Nanoparticles in Protein Crystal	81
<i>Yoshihiro Takeda, Tamotsu Kondow, Fumitaka Mafune</i>	
Transient Liquefaction During Laser Ablation	82
<i>N. Hastrup, X. Sedao, A. Conneely, G. O'Connor</i>	
Luminescent Silicon Quantum Dots Produced by Nanosecond Laser Ablation in Organic Liquids	83
<i>Kamal Abderrafi, Raul Calzada, Rafael Abargues, Juan Sanchez-Royo, Alfredo Segura, Rafael Ibanez, Vladimir Chirvony, Juan Martinez-Pastor</i>	

SEMICONDUCTORS I

Chairs: Giuseppe Compagnini, Vladimir Svrcek

Silicon Nanocrystals Prepared by Nanosecond Laser Processing in Liquid Media: Photovoltaic Applications	84
<i>Vladimir Svrcek, Davide Mariotti, Michio Kondo</i>	
Optical Properties of Femtosecond Laser-synthesized Silicon Nanoparticles in Liquid Environment	86
<i>R. Intartaglia, G. Das, A. Genovese, F. Brandi, E. Di Fabrizio, A. Diaspro</i>	
White Light- and Three Primary Colors of Light- Emitting Si Nano Crystals: Generation by Pulsed Laser Ablation in Supercritical Fluid	87
<i>K. Saitow, T. Yamamura, D. Kajiya, S. Wei</i>	

Toward a New Generation of Nanolight Sources	89
<i>M. Diouf, D. Amans, F. Chaput, G. Ledoux, C. Malaterre, C. Mancini, K. Masenelli-Varlot, P. Perriat, C. Dujardin</i>	

SEMICONDUCTORS II

Chairs: Nikolai Tarasenko, Csaba Laszlo Sajti

Luminescence of Single Particles Synthesized by Pulsed Laser Ablation in Liquids	91
<i>C. Mancini, D. Amans, F. Chaput, M. Diouf, G. Ledoux, C. Dujardin</i>	
II-VI Semiconductor Nanoparticles Synthesized by Laser Ablation in Liquid Environments for Applications in Organic Electronics	92
<i>N. Semaltianos, S. Logothetidis, W. Perrie, S. Romani, R. Potter, S. Edwardson, P. French, M. Sharp, G. Dearden, K. Watkins</i>	
Bismuth Telluride Based Nano-Particles Produced by Pulsed Laser Ablation in Liquid	94
<i>V. Kosalathip, C. Candolfi, B. Lenoir, S. Migot, A. Dauscher</i>	
Effects of Nature of Liquid Media on the Morphology and Optical Properties of Zinc Oxide Nanostructures Synthesized by Pulsed Laser Ablation	95
<i>S. Singh, R. Gopal</i>	
Reactive Quenching Process for the Generation of Nanoparticles, Nanocomposites by Laser Ablation in Liquid Medium: In the Case of Metallic Zn	97
<i>Changhao Liang</i>	

NON-EQUILIBRIUM FLUIDS

Chairs: Moreno Meneghetti, Ken-ichi Saitow

Carbon Nanostructures Grown by Plasma Processes in Liquid Environments	98
<i>G. Compagnini</i>	
Formation of Gold Nanowires by Laser Ablation in Liquid Helium	99
<i>V. Lebedev, P. Moroshkin, B. Grobety, E. Gordon, A. Weis</i>	
Control of Nanoparticles' Size by Pressurizing Ambient Water in Liquid-Phase Laser Ablation	100
<i>Wafaa Soliman, Noriharu Takada, Koichi Sasaki</i>	
Preparation of Metal Nanoparticles Using Laser Ablation with Liquids Under Evacuated Environments	102
<i>T. Tsuji, T. Hirai, T. Mizuki, M. Tsuji</i>	
Interaction Between Linear Carbon Chains and Metal NPs Prepared by Laser Ablation in Water	103
<i>G. Messina, L. D'Urso, E. Messina, S. Scalese, O. Puglisi, G. Compagnini</i>	

SPECIAL

Chairs: Tsuyoshi Asahi, Douglas B. Chrisey

Laser Ablation In Liquids: A Unique Route To Fabricate Hollow Micro/Nanoparticles From Bulk Materials	104
<i>Zijie Yan, Ruqiang Bao, Yong Huang, Douglas Chrisey</i>	
On-line Quantification of Underwater-Generated Laser Aerosols by ICP-MS	105
<i>Luca Flamigni, Joachim Koch, Detlef Gunther</i>	
Metal Nanoparticles by Pulsed Laser Ablation in Liquid Media: Synthesis, Characterizations and Application	106
<i>R. Swarnkar, R. Gopal</i>	
Silver Nanochain Generation Using Q-switched Nd:YAG Laser Ablation Technique in Distilled Water	107
<i>S. Alipour, P. Parvin, S. Keshmiri, S. Mortazavi</i>	
Preparation of Mg and MgO Nanostructures Using Laser Ablation Method	109
<i>F. Abrinaei, M. Torkamany, M. Hantezadeh, J. Sabbaghzadeh, M. Ghoranneviss</i>	
Author Index	