

6th Laser Ceramics Symposium

International Symposium on Transparent Ceramics for Photonic Applications

Münster, Germany, December 6 - 8, 2010



Photos: Presseamt Münster

Venue:

FACTORY Hotel
An der Germania Brauerei 5
48159 Münster, Germany
Fon +49 251-4188-0 • fax: +49 251-4188-999
mail@factoryhotel.de

www.fh-muenster.de/lcs-2010

Programme Overview

Sunday, 5th December

17:00 h - 20:00 h REGISTRATION

20:00 h Informal get-together at the "Tide" bar, Factory Hotel.

Programme Overview

Monday, 6th December

07:30 h - 11:00 h REGISTRATION

09:00 h **Welcome and general remarks**09:10 h **Where did the fifty-year search for laser crystals and ceramics take us? (invited)**Alexander A. Kaminski
*Russian Academy of Sciences, Institute of Crystallography, Moscow, Russia*09:35 h **High pulse energy and high average power laser by using a composite ceramic (invited)**Junji Kawanaka¹, Hiroaki Furuse², Takuya Nakanishi¹, Yasuki Takeuchi¹, Akira Yoshida¹
¹*Osaka University, Institute of Laser Engineering, Japan,*
²*Osaka University, Institute for Laser Technology, Japan*10:00 h **Thin-disk laser properties and photoconductivity of single crystalline and ceramic Yb:YAG**Susanne T. Fredrich-Thornton, Ulrike Wolters, Günter Huber, Klaus Petermann
*University of Hamburg, Institute of Laser-Physics, Germany*10:20 h **High efficiency lasing using 10% Yb³⁺ doped Lu₂O₃ ceramics**Jas Sanghera, Woohong Kim, Guillermo Villalobos, Jesse Frantz, Brandon Shaw, Fred Kung, Ishwar Aggarwal
*Naval Research Laboratory, Washington, DC, USA*10:40 h **Coffee break**11:10 h **Characterization of absorption losses in YAG laser ceramics (invited)**Romain Gaume, Bob Byer
*Stanford University, Ginzton Laboratory, Stanford, CA, USA*11:35 h **Effect of grain boundaries on the thermo-optical properties of Nd³⁺:Y₃Al₅O₁₂ highly transparent ceramics as a function of temperature**Antonio Benayas¹, Daniel Jaque¹, Jose García-Solé¹, Tomaz Catunda², Alexander A. Kaminski³, Carlos Jacinto⁴
¹*Universidad Autónoma de Madrid, Departamento de Física de los Materiales, Madrid, Spain,* ²*Universidade de São Paulo, Instituto de Física de São Carlos, São Carlos, Brazil,* ³*Russian Academy of Sciences, Institute of Crystallography, Moscow, Russia*11:55 h **Time-resolved luminescence characteristics of Ce and Nd doped YAG ceramics obtained by high pressure technique**Larisa Grigorjeva¹, D. Millers¹, K. Smits¹, D. Jankovica¹, W. Lojowski², Anna Swiderska Sroda², Wieslaw Strék³, P. Gluchowski³
¹*University of Latvia, Institute of Solid State Physics, Riga, Latvia,* ²*Polish Academy of Sciences, Institute of High Pressure Physics, Warsaw, Poland,* ³*Polish Academy of Sciences, Institute of Low Temperature and Structure Research, Wroclaw, Poland*12:15 h **Migration-accelerated luminescence quenching in spherical nanoparticles**Irina Basieva, Nikolay Glushkov, Tasoltan Basiev
*Russian Academy of Sciences, Prokhorov General Physics Institute, Moscow, Russia*12:35 h **Lunch**13:35 h **Ceramic materials for visible solid-state lasers (invited)**Ulrich Weichmann, Uwe Mackens, H. Moench, J. Opitz
*Philips Technologie GmbH Forschungslaboratorien, Aachen, Germany*14:00 h **Nd³⁺-doped Ba(Zr⁴⁺,Mg²⁺,Ta⁵⁺)O₃ ceramics as laser materials (invited)**Satoshi Kuretake¹, N. Tanaka¹, Y. Kintaka¹, K. Kageyama¹, H. Kurokawa², M. Tokurakawa², A. Shirakawa², Ken-ichi Ueda², Alexander A. Kaminski³
¹*Murata Manufacturing Co., Ltd. Japan,* ²*University of Electro-Communications, Institute for Laser Science, Shimane, Japan,* ³*Russian Academy of Sciences, Institute of Crystallography, Moscow, Russia*14:25 h **Transparent Nd:YAG ceramics fabricated by solid-state reaction method**Vladislav A. Shitov, V.V. Osipov, V.I. Solomonov
*Russian Academy of Sciences (Ural Division), Institute of Electrophysics, Yekaterinburg, Russia*14:45 h **Coffee break**15:15 h **Segregation phenomenon of rare earth dopants in ceramics (invited)**George Boulon^{1,2}, W. Zhao^{1,3}, S. Anghel^{1,4}, C. Mancini¹, D. Amans¹, T. Epicier⁵, V. Chani², A. Yoshikawa²
¹*University of Lyon, Physical Chemistry of Luminescent Materials Lab, Lyon, France,* ²*IMRAM, Tohoku University, Sendai, Japan,* ³*University of Science and Technology of China, Anhui, China,* ⁴*Institute of Applied Physics, Chisinau, Republic of Moldova,* ⁵*University of Lyon, Matériaux, Ingénierie et Sciences (MATEIS), Villeurbanne, France*15:40 h **Up-conversion phenomena in RE³⁺ doped transparent nanoceramics (invited)**Wieslaw Strék¹, P. Gluchowski¹, R. Wiglus¹, D. Hreniak¹, O. Ignatenko²
¹*Polish Academy of Sciences, Institute of Low Temperature and Structure Research, Wroclaw, Poland,* ²*National Academy of Sciences, Scientific-Practical Materials Research Centre, Minsk, Belarus*16:05 h **Thermo-optical measurements of ytterbium doped sesquioxides ceramics**Vanessa Cardinali¹, Emilie Marmois¹, Bruno Le Garrec¹, Gilbert Bourdet²
¹*CEA-CESTA (Centre d'Etudes Scientifiques et Techniques d'Aquitaine), Barp, France,* ²*LULI, École Polytechnique, Palaiseau, France*16:25 h **Transparent ceramics for photonic applications (invited)**H. Yagi, T. Yanagitani
Konoshima Chemical Co. Ltd, Takuma Works, Kagawa, Japan

16:50 h End of talks

Conference dinner:

18:30 h Bus departure from the Factory Hotel.

18:45 h Arrival at the historical museum "Mühlenhof".

22:00 h Return by bus to the Factory Hotel.

Programme Overview

Tuesday, 7th December

09:00 h **Optical properties of transparent GdYAG:Ce ceramics for white LED (invited)**

Setsuhisa Tanabe, Shotaro Nishiura
Kyoto University, Graduate School of Human and Environmental Studies, Japan

09:25 h **Microstructuration techniques for the development of miniturized Nd:YAG ceramic lasers (invited)**

A. Benayas^{1*}, W. F. Silva^{2*}, A. Ródenas³, C. Jacinto², J. Vázquez de Aldana⁴, F. Chen⁵, Y. Tan⁵, R. R. Thomsom³, N. D. Psaila³, D. T. Reid³, G. A. Torchia⁶, A. K. Kar³, D. Jaque¹
¹Universidad Autónoma de Madrid, Departamento de Física de Materiales, Spain, ²Universidade Federal de Alagoas, Instituto de Física, Grupo de Fotonica e Fluidos Complexos, Brazil, ³Heriot-Watt University, School of Engineering and Physical Sciences, Edinburgh, Great Britain, ⁴Universidad de Salamanca, Facultad de Ciencias Físicas, Departamento de Física Aplicada, Grupo de Óptica, Salamanca, Spain, ⁵Shandong University, School of Physics, Jinan, P. R. China
⁶CONICET-CIC, Centro de Investigaciones Ópticas, La Plata, Argentina

09:50 h **Preparation of YAG:Ce-dispersed transparent CaF₂ ceramics and application to white LEDs**

Hitoshi Ishizawa, Yoshinobu Ezura
Nikon Corporation, Materials & Advanced Research Laboratory, Kanagawa-ken, Japan

10:10 h **New development in ytterbium doped CaF₂ transparent ceramics for high power lasers**

Andréas Lyberis¹, Patrick Gredin¹, Gilles Patriarche², Daniel Vivien¹, Michel Mortier¹
¹Chimie ParisTech, Laboratoire de Chimie de la Matière Condense de Paris, France, ²Centre National de la Recherche Scientifique, Laboratoire de Photonique et de Nanostructure, Marcoussis, France

10:30 h **Coffee break**11:00 h **Transparent ceramics for optical and fluorescence applications (invited)**

Yvonne Menke¹, Edgar Pawlowski¹, Akio Ikesue², Axel Engel¹, and Bernd Hoppe¹
¹SCHOTT AG, Corporate Research and Technology Development, Mainz, Germany, ²World Labo Co. Ltd., Nagoya, Japan

11:25 h **Anisotropic ceramics as a next generation laser (invited)**

Takunori Taira
Institute for Molecular Science (IMS), Laser Research Center for Molecular Science, Okazaki, Japan

11:50 h **Spectroscopic and oscillation properties of Nd³⁺ ions in newly developed SrF₂ laser ceramics**

T. T. Basiev, Maxim E. Doroshenko, V.A. Konyushkin, D.V. Konyushkin, A.N. Nakladov, V.V. Osiko
Russian Academy of Sciences, Prokhorov General Physics Institute, Moscow, Russia

12:10 h **The microstructure of erbium-ytterbium co-doped oxyfluoride glass-ceramic optical fibers**

Elżbieta Augustyn, Michał Zelechower
Silesian University of Technology, Department of Materials Science, Poland

12:30 h **Lunch**13:30 h **POSTER SESSION****Transparent LuAG:Nd ceramics as alternative laser gain media**

Tobias Dierkes, Benjamin Herden, Thomas Jüstel
Münster University of Applied Sciences, Department of Chemical Engineering, Steinfurt, Germany

On the host lattice LiYF₄ doped by trivalent praseodymium as a transparent ceramic laser material

Benjamin Herden, Thomas Jüstel
Münster University of Applied Sciences, Department of Chemical Engineering, Steinfurt, Germany

On the correlation between the composition of garnet type materials and their photoluminescence properties

Arturas Katelnikovas^{1,2}, Dominik Uhlich¹, Helga Bettentrup¹, Julian Plewa¹, Aivaras Kareiva², Thomas Jüstel¹

¹Münster University of Applied Sciences, Department of Chemical Engineering, Steinfurt, Germany, ²Vilnius University, Department of General and Inorganic Chemistry, Vilnius, Lithuania

Electrophoretic deposition of cylindrical bodies from nano-alumina dispersions

Joanna Micior, Michael Bredol
Münster University of Applied Sciences, Department of Chemical Engineering, Steinfurt, Germany

Electrophoretic deposition of nano-yttria and nano-YAG

Joanna Micior, Michael Bredol
Münster University of Applied Sciences, Department of Chemical Engineering, Steinfurt, Germany

Ce³⁺ sensitized Nd³⁺ emission in garnet type structures

Stephanie Möller, Alexander Hoffmann, Thomas Jüstel
Münster University of Applied Sciences, Department of Chemical Engineering, Steinfurt, Germany

On translucent LuAG:Pr ceramics

Julian Plewa, Helga Bettentrup, Thomas Jüstel
Münster University of Applied Sciences, Department of Chemical Engineering, Steinfurt, Germany

Neodymium-doped 8/65/35 PLZT ceramics for photonic applications, obtained by different sintering methods

Malgorzata Plonska¹, Wojciech A. Pisarski², Lukasz Cienki¹
¹University of Silesia, Faculty of Computer and Materials Science, Sosnowiec, Poland, ²University of Silesia, Faculty of Mathematics, Physics and Chemistry, Katowice, Poland

Programme Overview

Tuesday, 7th December

13:30 h POSTER SESSION - Continuation -

Diode-pumped intracavity KTP frequency-doubled Nd:YAG ceramic laserDingyuan Tang¹, Zhenhua Cong^{1,2}, Jian Zhang³, Wei De Tan¹, Changwen Xu¹, Dewei Luo¹, Xingyu Zhang², Qingpu Wang²¹Nanyang Technological University, School of Electronics and Electrical Engineering, Singapore, ²Shandong University, School of Information Science and Engineering, Jinan, P.R. China, ³Nanyang Technological University, Temasek Laboratories, Singapore**Tuneable transparency in hydroxyapatite by varying sintering parameters and Strontium-doping**Syed Tofail¹, Abbasi Gandhi¹, Andrea Schatte^{1,2}, Jacek Zeglinski¹, Olga Korostynska¹, Michael Bredol²¹University of Limerick, Materials and Surface Science Institute, Limerick, Ireland, ²Münster University of Applied Sciences, Department of Chemical Engineering, Steinfurt, Germany**Peculiarities of nano-YAG synthesized by a glycothermal method**Mark Vorsthove¹, Thanh Huu Tran¹, Helmut Eckert², Ulrich Kynast¹¹Münster University of Applied Sciences, Department of Chemical Engineering, Steinfurt, Germany, ²University of Münster, Institute of Physical Chemistry, Münster, Germany**Direct comparison of preparative methods for nano-YAG particles and derived ceramics**

Mark Vorsthove, Tom Felbeck, Paul Motzek, Ulrich Kynast

Münster University of Applied Sciences, Department of Chemical Engineering, Steinfurt, Germany

The effect of MgO and SiO₂ codoping on properties of Nd:YAG transparent ceramicHao Yang^{1,2}, Xianpeng Qin^{2,3}, Jian Zhang^{2,3}, Jan Ma², Dingyuan Tang², Shiwei Wang³, Qitu Zhang¹¹Nanjing University of Technology, College of Materials Science and Engineering, Nanjing, P.R. China, ²Nanyang Technological University, Singapore, ³Chinese Academy of Sciences, Shanghai Institute of Ceramics, Shanghai, P.R. China**A fabrication process for Yb:YAG Ceramic and its lasing property**Jian Zhang^{1,2}, Dewei Luo¹, Xianpeng Qin^{1,2}, Hao Yang^{1,3}, Dingyuan Tang¹, Weide Tan¹, Zhenghua Cong¹, Changwen Xu¹, Shiwei Wang²¹Nanyang Technological University, Singapore, ²Chinese Academy of Sciences, Shanghai Institute of Ceramics, Shanghai, P.R. China, ³Nanjing University of Technology, Nanjing, P.R. China**Fabrication and properties of highly transparent Er:YAG ceramics**Jian Zhang^{1,2}, Xianpeng Qin^{1,2}, Hao Yang^{1,3}, Dewei Luo¹, Jan Ma¹, Dingyuan Tang¹, Shiwei Wang²¹Nanyang Technological University, Singapore, ²Chinese Academy of Sciences, Shanghai Institute of Ceramics, Shanghai, P.R. China, ³Nanjing University of Technology, Nanjing, P.R. China**Luminescence properties of MgAl₂O₄ nanoceramics doped with Eu³⁺ prepared by a high pressure****sintering technique: effect of grain size and strains**

R.J. Wiglusz, A. Bednarkiewicz, A. Łukowiak, P. Głuchowski, W. Stręk

Polish Academy of Sciences, Institute of Low Temperature and Structure Research, Wrocław, Poland

15:00 h Strength and strengthening of polycrystalline (ceramic) laser components (invited)Yehoshua Shimony^{1,2}, Revital Feldman¹¹Soreq NRC, Applied Physics Division, Yavne, Israel, ²Ben-Gurion University of the Negev, Department of Materials Engineering, Beer-Sheva, Israel**15:25 h Specificity of thermal effects in laser ceramics as compared to single crystals: theory and experiments (invited)**

Efim Khazanov

Institute of Applied Physics, Nizhny Novgorod, Russia

15:50 h Simple method to join YAG ceramics and crystalsV.B. Kravchenko³, S. N. Bagayev¹, A. A. Kaminski², Y. L. Kopylov³, I. M. Kotelyanski³¹Russian Academy of Sciences, Institute of Laser Physics SB, Novosibirsk, Russia,²Russian Academy of Sciences, Institute of Crystallography, Moscow, Russia,³Russian Academy of Sciences, Institute of Radio Engineering and Electronics named after V. A. Kotelnikov, Fryazino, Russia

16:10 h End of talks

Two alternative cultural programmes:

I. Guided tour of the Museum für Lackkunst

(Museum for Lacquer Art)

II. "Münster across" - a guided foot trip through the historical town

For both tours:

16:45 h Public bus departure at bus stop "Jahnstraße" (in front of the Factory Hotel"). You will be guided in the bus. Please do not forget your *Welcome Ticket* which will be provided to you together with your conference documents.

We take the line no. 6, direction "Münster Hilstrup Bahnhof" and go off at the main train station "Hauptbahnhof". Travel time is 17 minutes.

19:00 h End

Programme Overview

Wednesday, 8th December

- 09:00 h **Comparative investigation of cw and Q-switched laser characteristics of Yb:YAG ceramics and crystals (invited)**
Jun Dong
Xiamen University, School of Information Science and Technology, Department of Electronic Engineering, Xiamen, China
- 09:25 h **Towards ultra high intensity lasers (invited)**
Ken-ichi Ueda
Institute for Laser Science, Univ. of Electro-Communications, Chofu, Tokyo, 182-8585 Japan
- 09:50 h **Improvements in the processing of Yb:YAG ceramic materials**
Marina Serantoni¹, Laura Esposito¹, Andreana Piancastelli¹, Daniele Alderighi², Angela Pirri²
¹*ISTEC-CNR, Istituto di Scienza e Tecnologia dei Materiali Ceramici, Faenza (RA), Italy*
²*IFAC-CNR Istituto di Fisica Applicata "Carrara", Sesto Fiorentino (FI), Italy*
- 10:10 h **Processing control for fabricating high quality Nd:YAG ceramics (invited)**
Jian Zhang^{1,2}, Xianpeng Qin², Hao Yang², Dewei Luo³, Hua Gong¹, Dingyuan Tang³, Jan Ma¹, Shiwei Wang²
¹*Nanyang Technological University, Temasek Laboratories, Singapore*, ²*Chinese Academy of Sciences, Shanghai Institute of Ceramics, P.R China*, ³*Nanyang Technological University, School of Electronics and Electrical Engineering, Singapore*

10:35 h Coffee break

- 11:05 h **Growth of optical grade yttrium oxide single crystal via ceramic technology**
Maxim Ivanov, Irina Vyukhina, Vladimir Khrustov
Russian Academy of Sciences, Institute of Electrophysics, Ekaterinburg, Russia
- 11:25 h **Optical ceramics for solid state lighting (invited)**
George Wei, M. Raukas
Osram Sylvania, Beverly, MA, USA
- 11:50 h **The influence of anions during micro-jet-reactor precipitation of YAG-powders on powder properties and resulting microstructure**
Daniel Ganzer¹, Jan Werner¹, Ralf Diedel¹, Lothar Ackermann², Mathias Germann²
¹*Research Institute for Inorganic Materials – Glass/Ceramics GmbH, Hoehr-Grenzhausen, Germany*,
²*Research Institute for Mineral and Metal Materials – Gemstones/Noble Metals GmbH, Idar-Oberstein, Germany*
- 12:10 h Presentation: The LCS 2011 in Singapore

12:30 h Lunch

- 13:30 h **Fabrication of transparent nanoceramics through controlled amorphous crystallization**
Jiangtao Li, Lin Mei, Guanghua Liu
Chinese Academy of Sciences, Technical Institute of Physics and Chemistry, Beijing, P. R. China
- 13:50 h **Transparent hydroxyapatite ceramics with piezo and pyroelectricity**
Syed A. M. Tofail, Abbasi A. Gandhi, Olga Korostynska, Colm Johnson
University of Limerick, Materials and Surface Science Institute, Limerick, Ireland
- 14:10 h **Phase controlled stimulated Brillouin scattering phase conjugate mirror and its application to a coherent four-beam combination (invited)**
Jin Hong Kong, Sangwoo Park, Seongwoo Cha
Korea Institute of Science and Technology, Daejeon, Republic of Korea
- 14:35 h **Characterisation of optical components by means of time-of-flight secondary ion mass spectrometry**
Birgit Hagenhoff, Elke Tallarek, Reinhard Kersting
Tascon GmbH, Münster, Germany

14:55 h Coffee break and closing remarks

Thursday, 9th December

- 09:30 h Visit of research laboratories at Muenster University of Applied Sciences in Steinfurt (33 km from Münster)