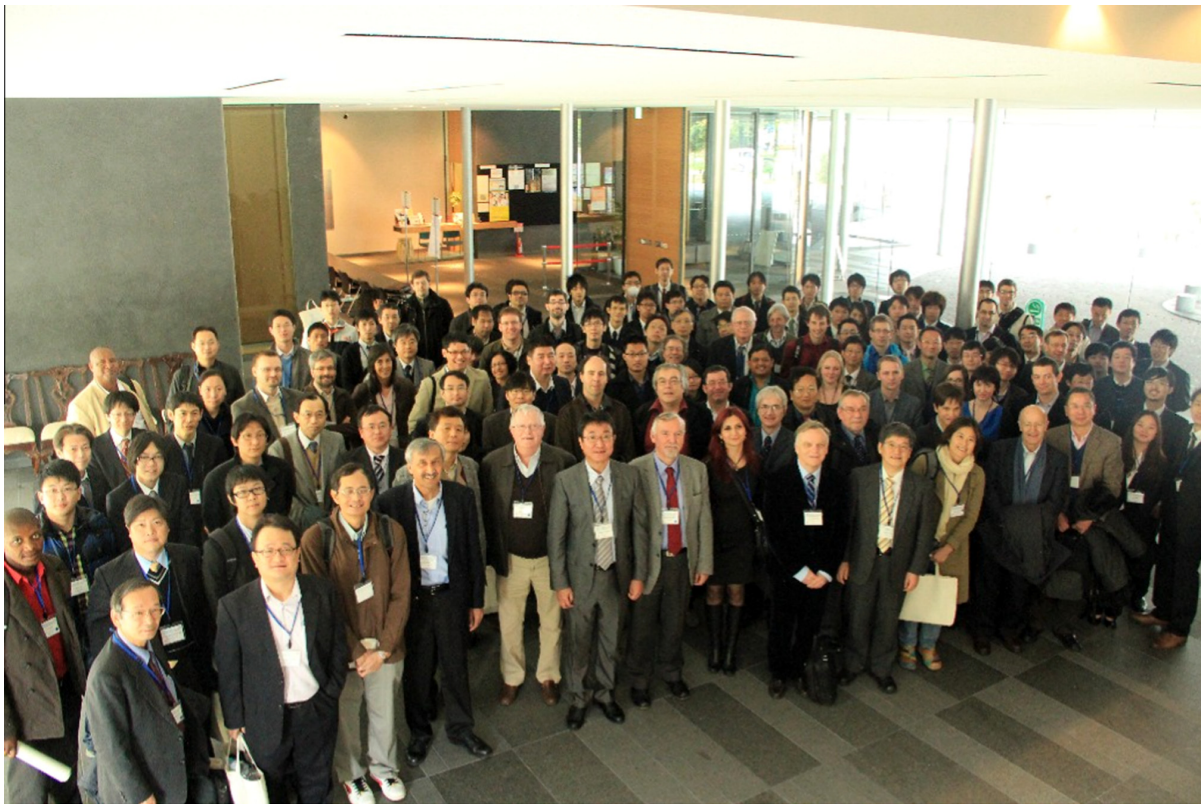
Optical Materials 35 (2013) 1877–1878

Contents lists available at ScienceDirect

Optical Materials

journal homepage: www.elsevier.com/locate/optmat

Preface: Photoluminescence in rare earths: Photonic materials and devices



Optical materials and photonic structures based on rare earth ions are the cornerstone of the scientific and technological building where photonics and material science smartly cooperate to develop new physics, new devices, and new applications in both high-tech domain and daily use tools. These ancient but ever innovative kinds of materials are used to construct luminescent structures, which can perform sensing and functionalized structures to address successfully the main socio-economic challenges that we are facing in many fields, going from health care to security, from energy saving to efficient and clean industrial production, from environment protection to fast and efficient communications Photonics, with its pervasiveness, has already been identified as one of the Key Enabling Technologies in the XXI century, and through advanced research it can not only give a strong contribution to find new technical solutions to still unsolved problems, but it can also pave the way to applications that up to now are far from being imagined. The Workshop on Photoluminescence in Rare Earths: Photonic Materials and Devices (PRE) has the motivation to provide a platform for the above mentioned prospects.

The Workshop on Photoluminescence in Rare Earths: Photonic Materials and Devices (PRE) has been held three times in Italy and the 4th in the series, PRE'12, was held in Kyoto, Japan, for the first time in Asia. Succeeding the good tradition of the previous workshops, (PRE'05, PRE'07 and PRE'10), the 4th PRE provided a forum for material scientists, chemists and physicists where to debate about the state of the art and the perspectives of the photonic materials based on rare earth ions.

0925-3467/$ - see front matter © 2013 Published by Elsevier B.V.
http://dx.doi.org/10.1016/j.optmat.2013.08.014

The PRE'12 workshop, promoted by several academic societies such as the Ceramic Society of Japan, the Rare-Earth Society of Japan, the American Ceramic Society, International Commission on Glass and others, was organized at Kyoto University campus on March 27–30, 2012, just before the spring season of cherry blossoms.

The Workshop ran for three days, composed of 21 invited (one plenary) talks, 39 oral talks and 80 posters and attracted 167 registered participants from 21 countries. The hot topics during the workshop included the ceramic lasers for high-power physics, novel phosphor materials for solid-state lighting, persistent phosphors for bio-imaging, quantum chemistry calculation for *5d–4f* transitions, unsolved mystery of RE-luminescence science and application of up- and down-conversion to the photovoltaics.

The full papers submitted for publication in Optical Materials were high in number and excellent in science, demanding an important standard peer review procedure. The result of the process is represented by the present Special Issue, that presents 35 papers, providing significant models of the above mentioned topics.

The presented articles provide insight into fundamental principles and modeling, fabrication, processing, characterization and exploitation of optical materials and photonic structures activated by rare earth ions for the intelligent management of light. Oxides, fluorides, telluride, silicon nitride – based bulk glasses and films, fiber lasers, waveguides, nanocrystals, glass–ceramics, nanoceramics are the object of the outcomes presented in this Special Issue devoted to the PRE'12 Workshop.

As to the Workshop itself, all the participants were appreciating very much the informal atmosphere, the warm hospitality including social programs of traditional Kyoto culture, and the excellent scientific level, which was activated especially by excellent compositions of top-class invited speakers, high-level oral presentations that were selected after a high competition rate from many abstracts submitted, and active discussion between many participants. The readers can enjoy the workshop atmosphere at the webpage of photo gallery (http://www.pre12.org/gallery.html).

We wish to express our sincere appreciation to all the members of the Scientific and Organizing Committees, who very much helped us to assemble a valuable technical program and to smoothly run the Workshop.

Thanks are also due to Graduate School of Human and Environmental Studies in Kyoto University, the Inoue Science Foundation, Asahi Glass Co., Nippon Sheet Glass Co., Nippon Electric Glass Co., Shin-Etsu Chemical Co., and several other companies, which have financially supported the organization.

We wish to thank the Optical Materials Editor, Prof. Georges Boulon, and the Elsevier staff for having offered us the possibility of this Special Issue.

We look forward to the next event in the series, PRE'14. Profs. Rolindes Balda and Joaquin Fernandez of Basque Country University, will welcome the participants in San Sebastian, Spain, on May 13–17, 2014.

Mark the date in your calendar! We hope to see you in beautiful San Sebastian!

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