



香港浸會大學  
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香港浸會大學理學院  
HKBU Faculty of Science  
Department of Chemistry

## ***DISTINGUISHED LECTURE SERIES 2014***

# **Brilliant Facets of Lanthanide Luminescence**



**Professor Jean-Claude G. Bünzli**

**Institute of Chemical Sciences & Engineering**

**Swiss Federal Institute of Technology**

**Lausanne (EPFL), Switzerland**

**Date: 20 May 2014 (Tue)**

**Time: 10:30 a.m.**

**Venue: Room 909**

**Cha Chi-ming Science Tower**

**Ho Sin Hang Campus**

**Hong Kong Baptist University**

**\*All Interested are Welcome\***



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## ***DISTINGUISHED LECTURE SERIES 2014***

# **The Fascinating World of Rare Earths**



**Professor Jean-Claude G. Bünzli**

**Institute of Chemical Sciences & Engineering**

**Swiss Federal Institute of Technology**

**Lausanne (EPFL), Switzerland**

**Date: 21 May 2014 (Wed)**

**Time: 10:30 a.m.**

**Venue: RRS 905, Conference Room**

**Sir Run Run Shaw Building**

**Ho Sin Hang Campus**

**Hong Kong Baptist University**

**\*All Interested are Welcome\***

## Brief Curriculum Vitae, Jean-Claude G. Bünzli



### Address

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J.-C. Bünzli was educated as a physico-chemical inorganic chemist and started to work on lanthanide coordination chemistry in 1975 by investigating solvation properties in organic solvents, then moving to macrocyclic chemistry of the trivalent ions, with as a red thread the unravelling of the relationship between structure and luminescence properties. This was followed by a successful incursion into the world of supramolecular chemistry, which led to the design of rugged, self-assembled luminescent bioprobes.

His present research interests deal with various aspects of luminescent lanthanide coordination and supramolecular compounds. He is developing luminescent bioconjugates for the detection of cancerous cells with time-resolved microscopy as well as materials for OLEDs, telecommunications, and solar energy conversion.

### Positions

- 1974 - 2001 Assistant-professor, then full professor of chemistry at the University of Lausanne.  
1990 - 1991 Dean elect of the Faculty of Sciences, University of Lausanne.  
1991 - 1995 Vice-rector elect of the University of Lausanne.  
2001 - 2010 Full professor of inorganic chemistry, EPFL, Lausanne  
2001 - Professor emeritus, University of Lausanne  
2009 - 2013 World Class University Professor at Korea University, Center for Next Generation Photovoltaic Systems (Republic of Korea)  
2010 - Professor emeritus, EPFL

### Invited Professorships

Lanzhou Northwest Normal University (1989, China), Université Louis Pasteur, Strasbourg (1996, France), Science University, Tokyo (1998, Japan), Université Catholique de Louvain (2008, Belgium), Université de Rouen (2011, France), University of Oxford (2012, U.K.)

Distinguished lecturer 2013/2014, Hong Kong Baptist University (2014, Hong Kong)

### Track record

351 published papers, 260 contributed communications and 219 invited lectures and courses. WOS: total citations: >14200; h-factor 59; ESI: 102 papers, 59 citations per paper; rank 628 out of 8991 chemists (top 7%).

### Editorial boards / reviewing

Senior editor of the *Handbook on the Physics and Chemistry of Rare Earths*. Specialty Chief Editor, *Frontiers in Inorganic Chemistry*. Member of the Editorial Boards of *Spectroscopy Letters* (1996-), *The Journal of Rare Earths* (2000-), *Journal of Coordination Chemistry* (2009-), *African Journal of Pure and Applied Chemistry* (2012-), *Medical Sciences* (2012-). Past EB member: *Acta Chemica Scandinavica* (1994-1999), *The Open Journal of Physical Chemistry* (2007-2012), *Inorganic Chemistry* (2010-2012).

Reviewer for *Nature*, *Nature Chemistry*, *Chem. Reviews*, *Chem. Soc. Reviews*, *Coord. Chem. Reviews*, *J. Am. Chem. Soc.*, *Acc. Chem. Research*, *J. Phys. Chem.*, *Inorg. Chem.*, *Anal. Chem.*, *Bioconjugate Chem.*, *J. Org. Chem.*, *Chem. Materials*, *ACS Nano*, *Crystal Growth & Design*, *Chemical Science*, *Chemical Advances*, *Chem. Commun.*, *Dalton Transactions*, *Phys. Chem. Chem. Phys.*, *J. Photochem. Photobiol.*, *Analyst*, *New J. Chem.*, *Nanoscale*, *Angewandte Chem.*, *Chem. Eur. J.*, *Chem. Asian J.*, *Eur. J. Inorg. Chem.*, *Eur. J. Physics*, *Inorg. Chim. Acta*, *J. Alloys Compounds*, *J. Luminescence*, *J. Coord. Chem.*, *Anal. Biochem.*, *Appl. Phys. Letters*, *Chem. Physics*, among others.

### Memberships

Founder and Secretary-treasurer, European Rare Earth and Actinide Society (1989-2012), president (2012-); Member of the Swiss Chemical Society (1971-); Member of the American Chemical Society (1974-); Fellow of the Royal Society of Chemistry, FRSC (2006-).

## Brilliant Facets of Lanthanide Luminescence

Jean-Claude G. Bünzli

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During the past decades, lanthanides and associated scandium and yttrium have reached a special status in high-technology in that they have become totally indispensable. In particular, the unmatched optical properties of lanthanide ions are crucial to the development of optical glasses, lasers, phosphors for screens and economical lighting, optical fibers for telecommunications, security inks and counterfeiting tags, bio-analyses and bioimaging, for instance.

After presenting luminescence properties and applications of the lanthanides, the lecture focuses on two aspects. The first one deals with the development of highly luminescent complexes and materials and explains the strategies adopted to enhance light emission and to avoid non-radiative de-activation. The second is concerned with biomedical applications of lanthanide luminescent probes and bioconjugates. The use of these luminescent stains extend from time-resolved immunoassays to cell and tissue imaging and photoactivatable drug delivery, for instance in the case of photodynamic therapy of cancer.

The efforts of the author toward the elaboration of robust, visible-emitting lanthanide binuclear helicates are also described. These entities are thermodynamically stable, kinetically inert and non-cytotoxic for a number of cancerous and non-cancerous cells. They enter into live cells by endocytosis and stain the endoplasmic reticulum. They can also be conjugated to monoclonal antibodies and a protocol for selective detection of biomarkers expressed by human breast cancer cells is presented.



