

Title **High-Sensitivity LEIS:
A new tool in the understanding of the performance
of catalysts and other (sub-) nanometer materials**

Speaker Prof. Hidde Brongersma
Director (CEO), Calipso B.V., The Netherlands
Honorary professor, Imperial College, U.K.



Date & Time Friday, Oct. 26, 2012 3:00 p.m.
Place INAMORI Hall, Ito campus, Kyushu University

Abstract

The outermost atoms of a surface largely control processes such as catalysis, adhesion, electron emission and growth. While analytic tools, such as XPS, probe an average of many atomic layers, Low Energy Ion Scattering (LEIS) can selectively analyze the outer atoms. In addition, non-destructive depth profiling (0 – 10 nm) with superior depth resolution is now possible for the heavier elements.

The High-Sensitivity LEIS, that we developed at the Eindhoven University of Technology and Calipso, is the basis of a new generation of LEIS instruments that is now produced commercially (the Qtac¹⁰⁰) by ION-TOF. Using imaging and parallel detection techniques the sensitivity of the LEIS technique has been increased by several orders of magnitude. Other features include improved mass resolution, increased sensitivity for the light elements and imaging. Since HS-LEIS is rather insensitive to the roughness of a surface, it bridges the gap between highly dispersed catalysts and model systems.

After an introduction of the technique, the focus will be on applications where valuable information has been obtained that is impossible (very difficult) to obtain with other analytical techniques. The new possibilities will be illustrated with a selection of examples from research on catalysts, SOFC and growth of ultra-thin films.

About the Speaker

Prof. Hidde Brongersma studied both physics and chemistry at Leiden University, where he also received his PhD. During his career he has worked at the interface of physics and chemistry. After a postdoc at Caltech he joined Philips Electronics where he was at the cradle of Low Energy Ion Scattering (LEIS). During his time at Philips he directed research on the development of the compact disc, optical fibers, and a variety of high-end glass applications. Parallel to his industrial career, he was appointed as a professor of chemistry at Leiden University. Later he joined the faculty of physics at the Eindhoven University of Technology. This gave him the opportunity to further develop the LEIS technique and apply it to solve problems in a great variety of materials applications. He holds patents on the compact disc, optical fibers and on LEIS. In Eindhoven he directed large research efforts on catalysis, polymers, III-V semiconductors and ceramics, and was a member of the Board of 2 Centers of Excellence in The Netherlands. Brongersma received numerous awards, an honorary doctorate and the prestigious Jacob Kistemaker prize in physics. Most recently, he started a successful start-up company, Calipso, which was at the basis of the High-Sensitivity LEIS technique that is now further developed and marketed by ION-TOF in Germany. In 2010 he was appointed as honorary professor at Imperial College in London.

Host: Professor Tatsumi ISHIHARA

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