

# BASIC SEMINAR OF ANALYTICAL INSTRUMENTS

**[Date/Time]** Wednesday, September 18<sup>th</sup>, 2019 10:00-16:30

**[Place]** Lecture room 2, Lecture Hall West- Faculty of Engineering,  
Ito campus, Kyushu University

**[Host]** Center of Advanced Instrumental Analysis, Kyushu University

**[Co Host]** Nanotechnology Platform, Kyushu University

**[Cooperation]** JEOL Ltd.

## **10:00-11:00 Basic Knowledge for Using SEM** Kazuteru Kawauchi

Since scanning electron microscope (SEM) was first commercialized about 50 years ago, SEM has achieved remarkable progress. As is well known, SEM can observe surface morphology and compositional contrast, and various types of SEMs have been developed. However, their performance and functionality are greatly different from each other. To utilize these different SEMs, it is essential to recognize their features as well as to correctly understand the contrast information of SEM image. The aim of this lecture is to help SEM users to understand the basics of SEM, including the instrument principals, specimen preparation and elemental analysis.

## **11:00-12:00 Introduction to EPMA** Rie Wakimoto

The Electron Probe Micro Analyzer (EPMA) is an effective instrument for surface observation, elemental analysis and measuring the elemental distribution of a variety of materials, including metals, minerals, and others by irradiating electron beams onto the substance surface. EPMA today is playing an active role worldwide, as an all-purpose, multi-functional tool equipped with electron optics technology, X-ray spectrometry technology, system control and data processing technology. EPMA has evolved into an instrument that can handle elemental analysis of sub-micron areas as well as observation, analysis, and image analysis for large areas. This session is a lecture about the basic principle of EPMA, especially WDS (Wavelength Dispersive X-ray Spectrometer). In addition, some applied analyses examples are introduced.

## **13:15-14:45 Introduction to Mass Spectrometry** Jun Tamura

Mass spectrometry (MS) has extremely wide applications – from the elemental and isotopic analysis of extraterrestrial materials to the comprehensive analysis of proteins in human body. MS is also quite different from any other spectrometry/spectroscopy – they rely on the excitation by and absorption/emission of electro-magnetic radiation (radio wave, infrared/visible/ultraviolet light, X-ray, and gamma ray) whereas MS directly deals with the atoms and molecules. This makes MS an extremely powerful analytical technique but also difficult for the beginners to get into – many of the concepts and terms used are unique to MS and there is no analogy in other analytical techniques.

This lecture covers basics of MS, including the principle, instrumentation, and the concepts and terms unique to MS. Some popular applications of organic MS are also discussed.

## **15:00-16:30 Get the most out of your NMR instrument.**

### **Practical Tips** Dr. Pavlos Stampoulis

What is shimming? What is lock signal? Why I need tuning? How I can optimize experimental time? Answer to these questions is not a requirement for operating a NMR instrument. NMR spectrometers can operate in a highly automated mode reducing input from a user to a minimum. Nevertheless, knowledge of how a spectrometer works gives the user a better control of the instrument and allows him to operate it in a more efficient and productive way. In this short lecture, I will explain the preparatory NMR procedures prior to execution of a NMR experiment and the main acquisition parameters that define a NMR experiment.

You can enter or exit any time during this seminar. Please register in advance.

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