Introduction of Application Centers in HORIBA China

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HORIBA Application centers in China have gone through different phases. All of them were dedicated to meet all requests from the Chinese market. At the same time, they are reference to show HORIBA capabilities on advanced techniques of optics and spectroscopy. In 2022, with the opening of Analytical Solution Plaza (ASP), the new era is coming.

Introduction

In 2008, HORIBA Scientific settled its first demo system in Beijing. From that day, a new business mode started in China, with seeing is believing. In these early stages, customers were interested to see instruments specifications and reliable results from their own samples.

As, our business and customer base grew with time. In 2011, to better support our growth and our customer base, we expanded our capabilities in Beijing and opened a new application center in Shanghai. While, in Beijing, the application center was focused on demonstrating the performances of our Raman and Fluorescence systems, in Shanghai, our customers had access to most of our HORIBA Scientific products. At the same time, we grow the number of application engineer and their skills to provide regular training classes to our customers and education program to the next generation of customers. This program based on optical technologies became popular in China under the name of HORIBA Optical School.

To increase our business, addressing industrial needs is required. Nowadays, we see an increasing demand from industry to provide solutions to different issues they are facing. Providing a solution means understanding the customer pains and having the capabilities to solve them in a short time.

Our company made a big strategic investment in China, by building a big facility in Shanghai, the HORIBA C-CUBE. In this new facility, a large area is dedicated to demonstrating all HORIBA technologies and to provide a series of solutions for current and future needs of the China Industry, named, Analytical Solution Plaza (ASP). The open ceremony is planned for this year. The ASP is an open space, designed to show in a glance for visitors, all HORIBA advanced techniques such as elemental

Figure 1 Application Center in Beijing.

Figure 2 Application Center in Shanghai.

analysis, molecular analysis, surface/coating analysis, particle size analysis etc. The ASP is divided into four markets area, Energy, Semiconductor, Environment, and Life Science, which are in line with both the China market trends and company megatrend directions. As example, clean energy is one of the key points to achieve the carbon peak and carbon neutrality. Lithium battery, hydrogen, solar cells are all playing a significant role. In ASP, the team will continue our mission to bring out solutions besides graphitization degree characterization for LiB materials, silicon crystallinity and thickness for solar cell, and so on.

These application solution examples will be shown briefly on digital panels in each relative area. Visitors can play with the digital panels to understand HORIBA capabilities to solve their issues. The examples will grow with time by building collaborations with Key Opinion Leaders in the field of each application. To meet the local customization needs, the application team in ASP will work closely with Local Engineering team to fix the specifications and to evaluate the prototype. In such a way, customized solutions are provided to customers with China speed. With ASP, a close collaboration between HORIBA segments is expected to expand our offer and support our customers in semiconductors, automotive and environmental customers.

Let's light up a bright future with our ASP in HORIBA C-CUBE.

Figure 3 The entrance of ASP in HORIBA C-CUBE.

HCT application center solution case examples

Micro Fluorescence Solution for Perovskite based Solar Cell

Perovskite solar cells have become highly efficient nowadays. However, a number of challenges remain before they can become a competitive commercial technology, e.g. stability, scale, etc.

The film uniformity is one of the key specifications for perovskite solar cell produced by different processes. A good sample was acquired from one of the top labs for perovskite research in China. We made the investigation with Nanolog with CCD detector and microscope to see if there is any difference from the crystals and thus to check the film uniformity. Weak NIR emission was observed from the samples under microscope.

We made our first try to process the data with Labspec software. It is very interesting to get the distribution of peak position and peak width from the film on bare glass substrate. The peak position is different from different size and shape of the crystals. The FWHM distribution

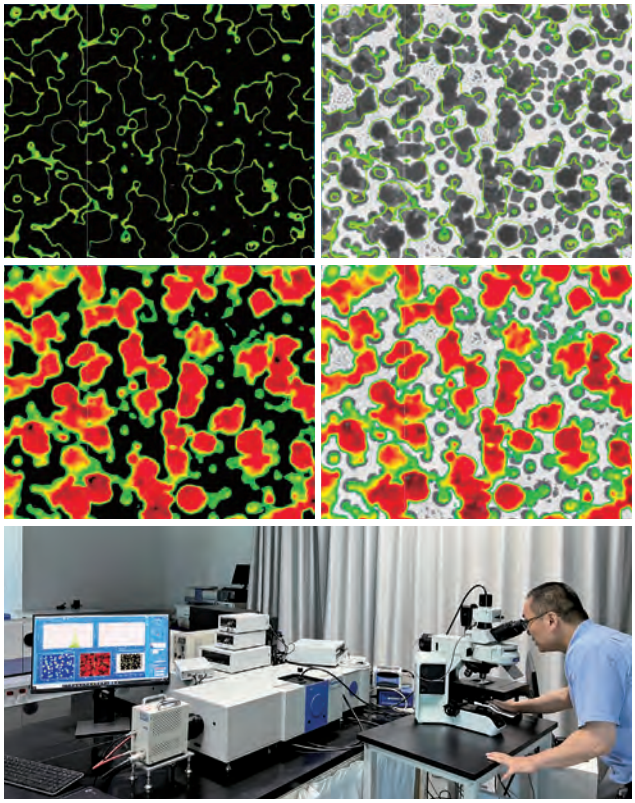

Figure 4 Peak position distributions and Nanolog.

images further confirm that the perovskite film is composed of different defected or non-uniform crystal forms. Lifetime mapping will be our next goal for this kind of sample.

Solution with Multi Techniques for Archeology

Black-glazed porcelain, especially Jian (Tenmoku) wares, which are famous for their lustrous black glaze that exhibits unique colored patterns, is highly valued in China and other Asian countries.

In collaboration with SIOM, CAS, we had the chance to understand both the elemental and compositional information from black-glazed porcelain using XGT and Raman spectroscopy respectively.

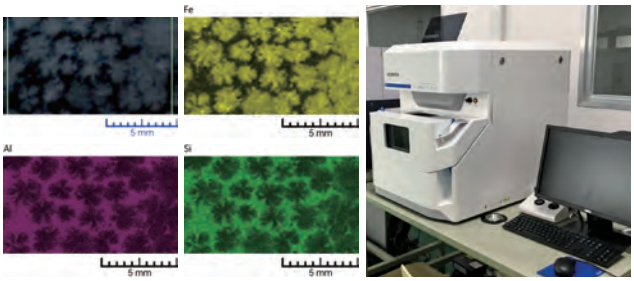

Figure 5 Fe, Al, Si distribution and XGT-9000.

It is well known that the black-glazed porcelain is iron rich. From XGT images, we can see a clear Fe precipitation on the silvery appearance of the snow like patterns.

Besides, it is interesting to know the phase of iron oxide which can well reveal the firing conditions and firing procedure of ancient ceramics.

With Raman analysis, it is found that the snow like patterns are composed of hematite (α-Fe_2O_3) and the dark background are composed of ε-Fe_2O_3 wherever it appears in crystal or non-crystal shape under microscope.

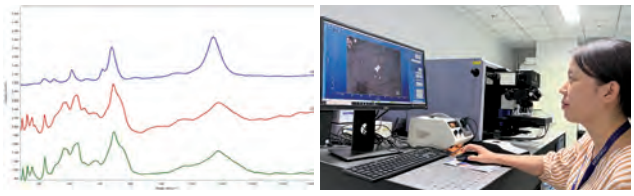

Figure 6 α-Fe_2O_3/ε-Fe_2O_3 spectra with LabRam Odyssey.

* Editorial note: This content in based on HORIBA's investigation at the year of issue unless otherwise stated.

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