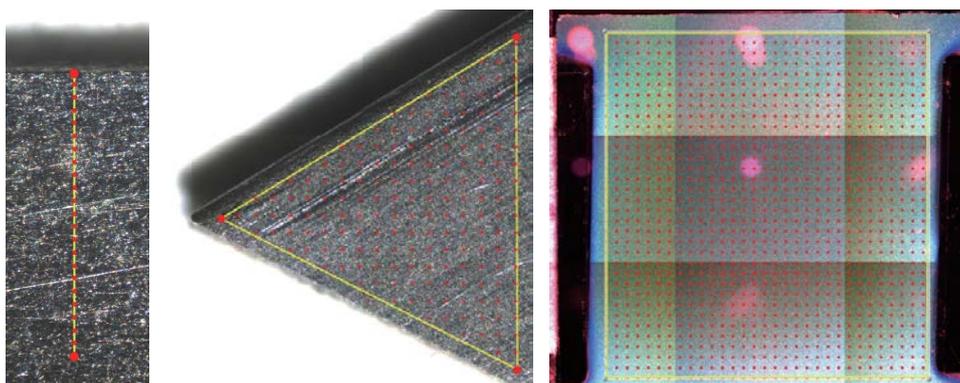


## SmartLab Studio II: Data Visualization plugin #1 — XY mapping

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Homogeneity/inhomogeneity often has a major influence on a material's physical properties. Therefore, it is very important to control homogeneity/inhomogeneity during the development of these materials. X-ray analysis provides information on composition, layer thickness, residual stress, etc. of the adjacent surface of a sample, and evaluates homogeneity/inhomogeneity by moving the X-ray irradiation position on the sample surface. (In practice, the sample is moved along the X and Y directions instead.) When a small-collimated incident X-ray beam (a few hundred microns  $\phi$ ) is available, very small areas of a sample can be analyzed.

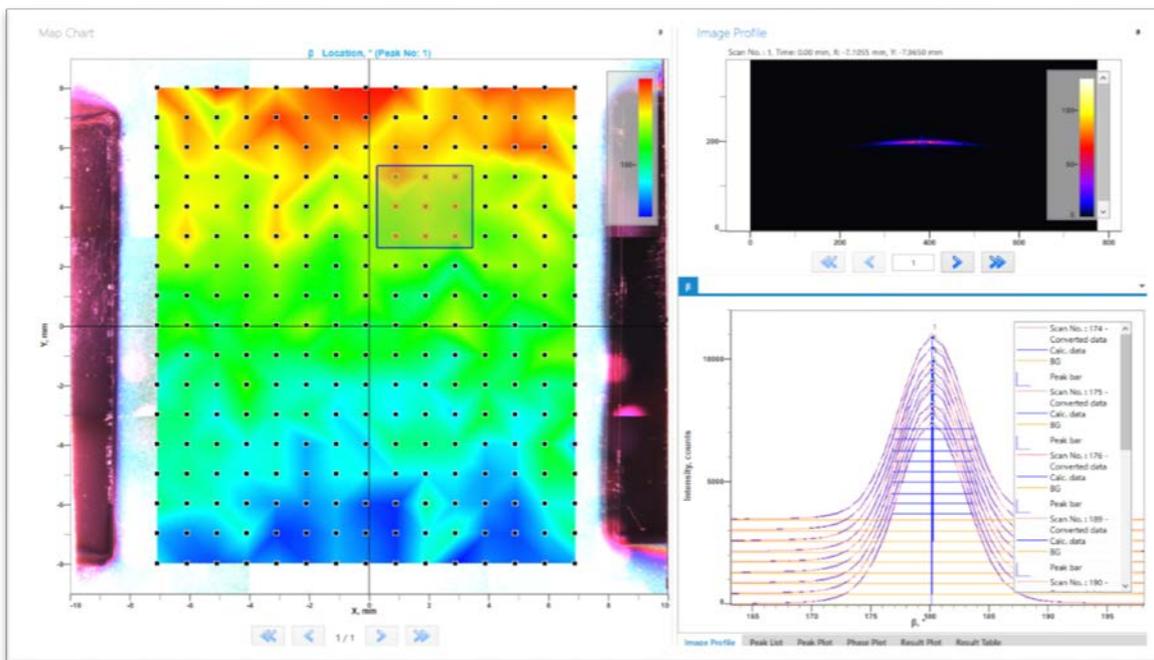
In SmartLab Studio II, you can specify the positions on the sample surface to be measured and select which type of measurement should be made at the specified measurement positions. First, you should define the measurement area using a line, a triangle, or a rectangle, then specify the X- and Y-step sizes. This defines the array of measurement positions inside the specified area. If you want to pick arbitrary positions on the sample surface, click the desired positions on the sample snapshot where you want to make the measurement. The sample snapshot is taken using a CCD camera, and the measurement positions are determined precisely by the X- and Y-axes of the SmartLab.



The obtained measurement data can be handled in various ways in the Data Visualization plugin.

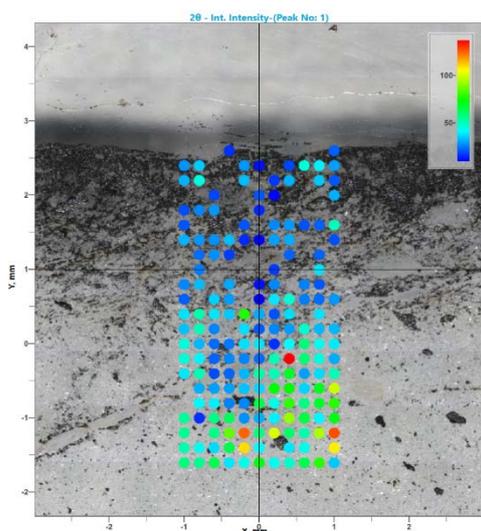
First, load all the measured data for XY mapping into the Data Visualization plugin. The sample snapshot is displayed on the left side of the main window and the measured data sets are displayed on the right side. By default, all the 1D profiles are displayed (overlaid) in one chart. If 2D images are loaded, the 2D data set that was measured first is displayed. All the 2D images can be converted to 1D profiles after they are loaded.

The measurement positions are also overlaid on the sample snapshot. When you click one of the measurement positions, the corresponding 1D profile and/or 2D image will be displayed on the right side. When you specify an area on the sample snapshot, the 1D profiles obtained from the measurement positions inside the specified area will be displayed in the chart.

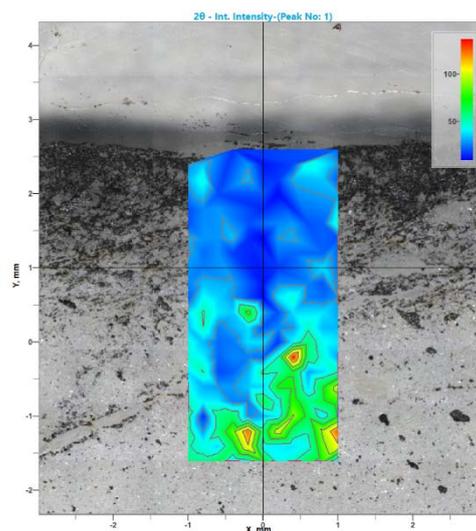


Next, analyze all the measured data under the same conditions. If 2D images are loaded, you should convert them to 1D profiles first.

These analysis methods are available in the Data Visualization plugin: peak search, phase identification and quantitative analysis, residual stress analysis, reflectivity analysis, etc.. After the analysis is complete, select parameters such as peak positions, integrated peak intensities, quantitative values of crystalline phases, residual stress, layer thicknesses, and so forth. Then, mapping results based on the selected parameters will be overlaid on the sample snapshot in the following display styles.



With dots



A color map and/or a contour map