THE BRIDGE

MATERIALS ANALYSIS eNEWSLETTER

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The D/teX Ultra 250: A large capture angle and large active area make this new detector the most effective way to increase data collection speed

The need for speed

Many X-ray applications demand more speed. Whether you run an oversubscribed, multi-user diffraction laboratory or you are running experiments that require a large number of repetitive measurements, you will benefit from reducing the time it takes to make each measurement.

Rigaku's new D/teX Ultra 250 is a 1D silicon strip detector that was designed to help you immediately improve your throughput when coupled to the SmartLab diffractometer (Figure 1). With a higher capture angle and a larger active area than the previous D/teX model, the D/teX Ultra 250 is now 70 to 90% faster than competitive detectors. This means that the D/teX Ultra 250 on a SmartLab diffractometer can almost double your throughput compared to competitive equipment.

Applications that can benefit

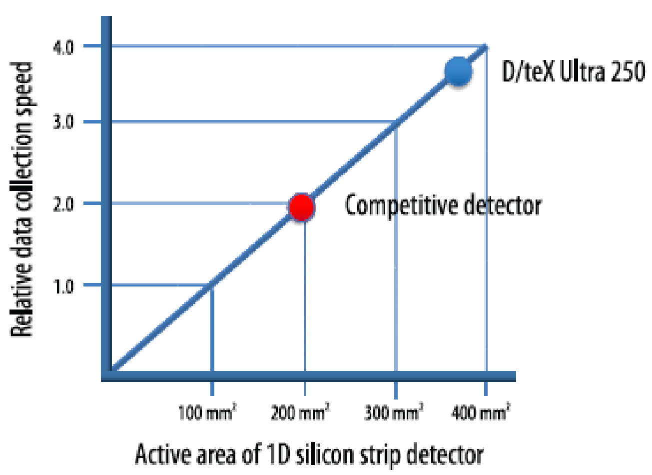
Measurements that benefit from a reduction in measurement time are numerous, especially for a multi-purpose diffractometer like the SmartLab.

Examples include:

- Micro-area measurements on small samples
- Focusing transmission measurements on organic samples
- High-resolution reciprocal space mapping
- *in-situ* experiments
- High throughput analysis
- *K*α1 data acquisition

How did we do it?

In this new and improved model, higher angular resolution was achieved by using a smaller pixel pitch (0.075 mm versus 0.1 mm) and increased 2θ coverage



was achieved by increasing the length of the detector (19.2 mm versus 12.8 mm).

At a diffractometer radius of 300 mm, the stationary 2θ coverage is now 3.7° versus 2.4° in the previous model. The increased angular coverage is of course useful in stationary measurements, such as residual stress, but also the increased active area of the detector provides the large increase in speed that is so useful for many applications.

Fantastic Energy Resolution

With a 1D silicon strip detector it is challenging to engineer a solution that allows sufficient suppression of the Cu *Kβ* line, Co *Kβ* fluorescence, and Fe (or lower Z) fluorescence. Rigaku has approached this problem by looking at the complete suppression achieved with a secondary monochromator and scintillation counter and then working backwards to incorporate the added benefit gained from using a 1D detector. The resulting solution gives the only true *Kβ* and fluorescence suppression for a 1D silicon strip detector when using Cu radiation (it is estimated that 99% of all powder diffraction data is measured with Cu radiation).

Click here for more information on the D/teX Ultra 250

