EXPANDING THE ANALYTICAL RANGE OF WDXRF - NEW XRF ANALYZER CRYSTALS

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New synthetic multilayer crystals enhance the analytical range and performance of WD XRF instruments such as the S8 TIGER. The newly developed X-ray optics provide extra sensitivity, improve resolution and precision for light elements. The applicable application range of WDXRF is therefore expanded.

Industrial minerals and the cement industry require fast and very precise determination of Si and Al among others. For Al and Si traditionally the organic crystal pentaerythrite crystal is used. PET crystals are very sensitive to temperature changes due to their high thermal expansion coefficient, which results in peak shifts of 0.5 degree 2theta or more. Although conventional WDXRF instruments are stabilized better than 0.1 degree, downtime will occur when an instrument undergoes maintenance and requires time to get back to temperature. It can take up to 1 day for the PET crystal to be fully equilibrated. Failures and changes in the temperature stabilization will also dramatically affect results. Being cut from an organic material, the PET also degrades over time due to X-ray exposure. This slow decrease of intensity requires a drift correction of the system or finally replacement of the crystal. All factors add to increases in downtime and cost of ownership.
The new multilayer structure XS-CEM is a non-temperature sensitive, stable, non-degrading synthetic crystal with increased sensitivity for Al and Si. Analytical data will show how it outperforms the PET crystal for a typical cement application.

The new multilayer crystal, made out of a La-B4C structure with a typical layer thickness of 190 nm, offers slightly better resolution due to lower d-spacing, but 20% more intensity than traditional Mo-B4C based multilayers. For light element applications, the combination of the XS-B crystal and a coarse collimator is paramount for good analytical performance.

Especially for petrochemical applications the determination of low concentrations of sulphur and phosphorous is challenging. The new curved germanium(111) crystal has increased the intensity by more than 40% for P and more than 20% for S resulting in detection of 0,2 ppm in automotive fuels.