

## **Grade control of ore and industrial minerals with a new XRF instrument design – benefits of a combination of XRF detector technologies**

K. Behrens, F. Portala, A. Buman, P. de Pape. **Bruker AXS**, Madison Wisconsin

Simultaneous wavelength-dispersive XRF instruments are delivering accuracy and precision in the shortest possible measurement time. Traditionally these instruments are configured with fixed single-element channels in Rowland circle geometry for the elements of interest. This makes them an indispensable tool for process control in metals and mining. The quick analysis of metal samples from the furnace allows producers to fine tune final alloy grades. The high analytical speed provides maximum sample throughput in mining service labs worldwide. Can those instruments keep up to date with recent and future requirements?

New environmental regulations are enforcing the control of hazardous elements in the final products: The early knowledge about contaminations from scrap metals will help producers avoid, for example, Cd or Pb contaminants in their final alloys. The accurate control of the ore will ensure delivery of a higher-grade ore free of contaminants. The new requirements will demand a higher degree of analytical flexibility that cannot be fulfilled with traditional setups.

A new instrument design combines the analytical performance of a conventional configuration with fixed wavelength-dispersive element channels, and a simultaneous energy-dispersive detector in order to achieve high analytical precision and accuracy. While the elements of interest are measured, the energy-dispersive detector records the complete spectrum of the sample. This “snap shot” of the elemental composition enables monitoring of all elements present in the sample, but adds no additional measurement time. Sensitive X-ray detectors are operating in this simultaneous WDXRF instrument with a high count rate.

The precise control of ore grades, especially of iron, copper or manganese ores, with the monitoring of all other elements present in the sample, delivers the exact knowledge of the commercial value. The complete sample spectrum also helps identify misalignments in the WDXRF setup since, for every sample, the detector delivers a second, independent evaluation. A big difference in results highlights the problem immediately.

Application examples for grade control of ores and industrial minerals are shown to demonstrate and to explain the use of this new XRF detector combination.

