



Handheld X-Ray Diffraction Analysis

Handheld instrument that can provide rapid analysis for the detection of a specific mineral or crystalline phase with no sample preparation.



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Seeking

Licensing, Development partner

About **University of Leicester**

The University of Leicester works hand in hand with industry to generate business growth and find real applications for its leading innovation and research.

Background

Current X-ray diffraction (XRD) methods usually require careful sample preparation, such as grinding to a fine powder. The sample, or part of it, is destroyed in the process.

Conventional XRD instrumentation is bulky with limited portability, so samples have to be sent to off-site laboratories with a turnaround time of days or weeks.

Tech Overview

Handheld XRD instrumentation that can provide a rapid (1-2 mins) in situ phase analysis of a sample with no preparation requirement.

- Avoiding sample preparation is a key time-saving step in itself, and the sample is analysed in its native condition with no biases or changes introduced by preparation methods.
- Multiple potential applications including mining (e.g. iron ores, limestone quality), metals and alloys, especially steel analysis, and cultural heritage.
- Instrumentation can be tailored to provide enhanced detection of a specific mineral or crystalline phase.
- For mining and industrial applications, streamlining of operations provide major cost savings. An example is grade control of iron ores prior to shipping.

Benefits

- The same instrument can also provide elemental analysis by X-ray fluorescence (XRF), complementary to the XRD phase analysis.
- Much lower cost of instrumentation.
- Easy-to-use handheld operation with an instrument weighing ~2 kg.
- In mining applications, provides rapid delineation of ore boundaries and rapid assays at the mine face.
- Assessment of ore grades allows efficient management of blasting, excavation and haulage.
- For manufacturing applications e.g. steel production, provides rapid feedback of production processes and minimises losses.

Applications

- For mining applications, this product serves to improve the overall mine efficiency in several ways, yielding considerable costs savings and minimising waste.
- In metallurgy, allows rapid fine tuning of difficult-to-control manufacturing processes.
- Rapid retained austenite sorter e.g. quality control of parts using a threshold criterion.

- Optimisation of heat treatments in the manufacture of, for example, advanced high strength steels.

Opportunity

Two technologies supported by two independent yet related patent applications. Depending on the intended applications, either or both patents could be utilised.

Available for licensing for both patents.

Also available for collaborative development with industry in new fields and applications.

Patents

- Methods and apparatus of X-ray diffraction: AU2013250980, US2013279653, EP2839269.
- X-Ray analysis device: PCT/GB2016/051559