CT scan service

Computed Tomography (CT) scanning coupled with X-ray Fluorescence (XRF): Quantitative 3D drill core analysis

Introduction

As a world class microfocus x-ray CT scan facility, our aim is to provide high quality, fast turnaround microCT scans for all our clients as well as expanding our analysis capabilities. The latest addition to our analytical techniques is a Niton XL3t hand held XRF analyzer. This provides the option of an "on the spot" XRF analysis to determine the chemical composition of your samples. The analysis is available for a large range of applications from geology, soil science, metal castings, plastic molds, testing for lead in baby products, and we can even come to your site for quick and easy elemental analysis.

CT Scan combined with XRF Example

In this example half a drill core segment (3 x 5 x 1.5 cm) was CT scanned to visualize and quantify the 3D distribution of Tungsten. The Tungsten particles are the densest particles in the drill core and are shown in the 3D image in Fig 1, with colour coding to indicate particle size. To quantify this, a Tungsten particle is identified in a CT slice image (Fig 2) on the surface of the core sample (Fig 3). An XRF analysis (Fig 4) confirmed this particle as Tungsten. A similar measurement on other spots produce no Tungsten peaks in the XRF measurement. The combined information from microCT and XRF provides a volumetric measurement of 0.4 % Tungsten in this drill core sample.

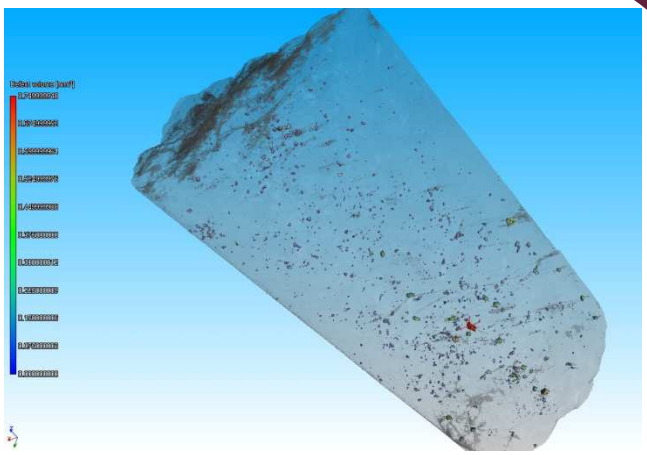

Figure 1*: 3D distribution of Tungsten particles inside a drill core, from microCT scan data. Particles are colour coded to show the largest in red and smallest in blue. Analysis done with VGStudioMax 2.1.*

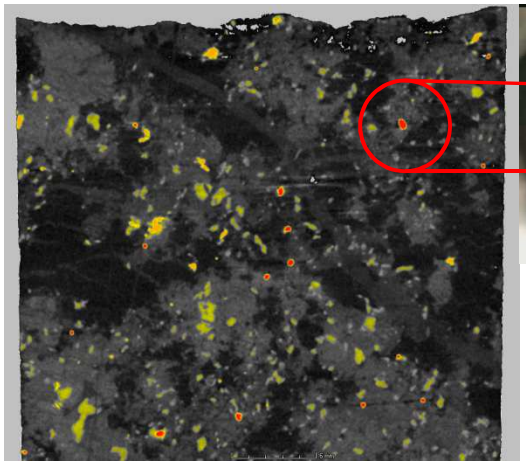

Figure 2: *CT Slice image showing Tungsten particles in red*

Figure 3*: Location of the mineral on the surface of the drill core sample as observed by the Niton XRF.*

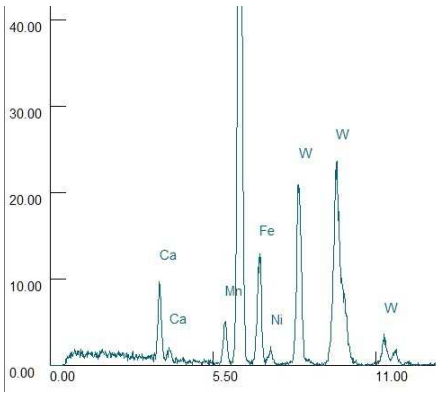

Figure 4*: Niton XRF spectrum indicating the presence of tungsten (W). The measurement is averaged over a 3 mm spot, hence the other elements present.*

Costs & Requirements

The full analysis presented here including the XRF and CT analysis (with particle size distribution and 3d image) is R3400 per sample plus additional charge of R850 in the case of less than 5 samples per batch. For international clients: exchange rate is approximately R10 = 1 US$. Fast job turnaround times are ensured at all times, typical is 24 hours from sample delivery.

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