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X-rays for earth science - Adding new dimensions to the analysis of mineralogical samples

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Powder X-ray diffraction analysis (XRD) has traditionally been applied to mineralogical samples for decades in order to identify and quantify the minerals in various types of rocks. Recent developments like the emergence of modern multipurpose diffraction platforms and the development of 2-dimensional detectors result in a variety of new applications suitable for the characterization of geological materials.

New applications, such as phase distribution mapping and computed tomography on a multipurpose diffractometer will be discussed on dedicated case studies. It will be demonstrated how the combination of multiple analytical approaches can improve the understanding of the properties of rocks, minerals and ores, figure 1.

One case study will demonstrate the successful combination of powder diffraction, microdiffraction and CT analysis to characterize a meteorite sample. The results from small spot mapping using microdiffraction are compared with the results from the mapping of the elemental composition of the same sample using a Zetium spectrometer.

The discussion will include some of the practical aspects of the measurement including the time needed to conduct such measurements.

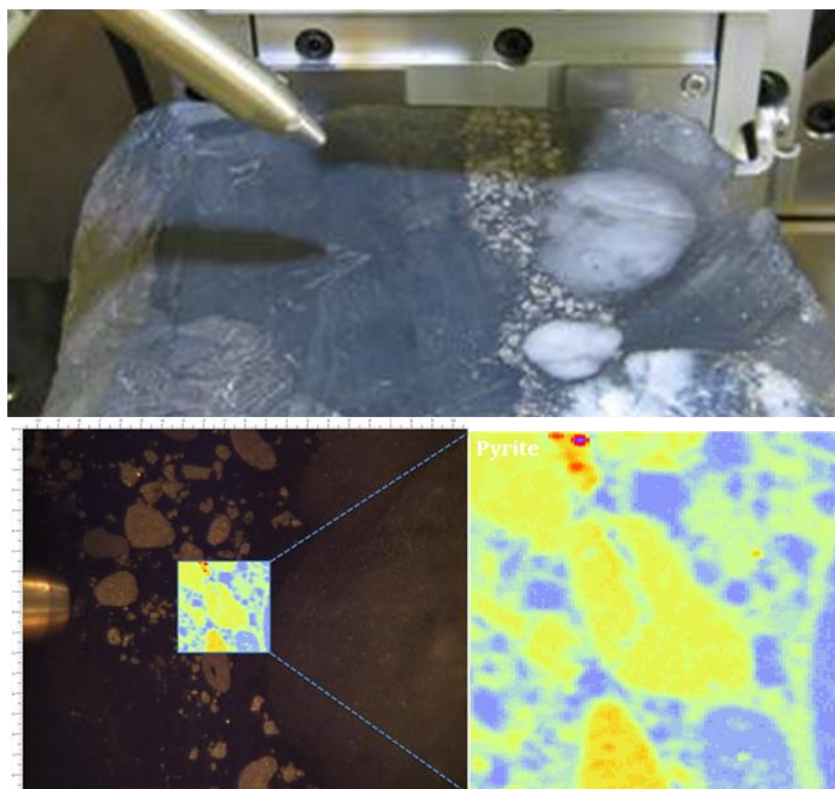


Figure 1: Small spot mapping of the mineralogy of a gold ore

sample (Witwatersrand conglomerate)

