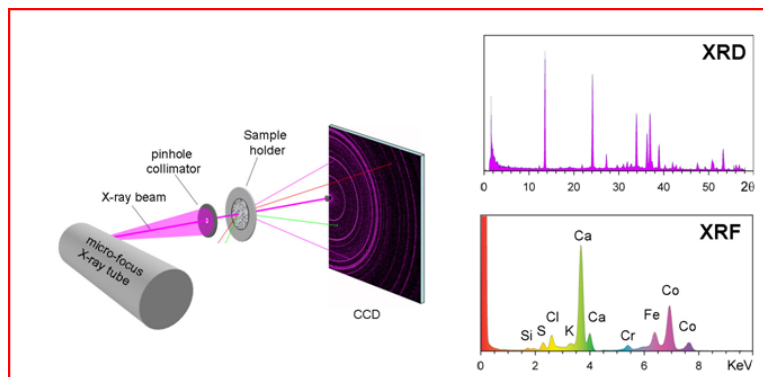


Title: Rapid mineral identification and quantitative analysis of Trona samples.

Introduction: The inXitu Terra combined XRD/XRF instrument utilizes a patented method for rapid and easy collection and processing of XRD data. With only ~15mg of sample, Terra is able to collect the entire practical two-theta range simultaneously. With no mechanical goniometer or associated moving parts, Terra is both precise and accurate. With the unique ability to collect both position (XRD) and energy (XRF) information simultaneously, Terra is able to provide a vast amount of information with one analysis. The principal of this operation is shown below.



Sample preparation: The samples received were ground to 120-140 mesh and inserted into the patented sample chamber as shown below. Sample preparation with Terra is truly easy, requiring only that the sample pass through a 100um sample sieve as shown below.

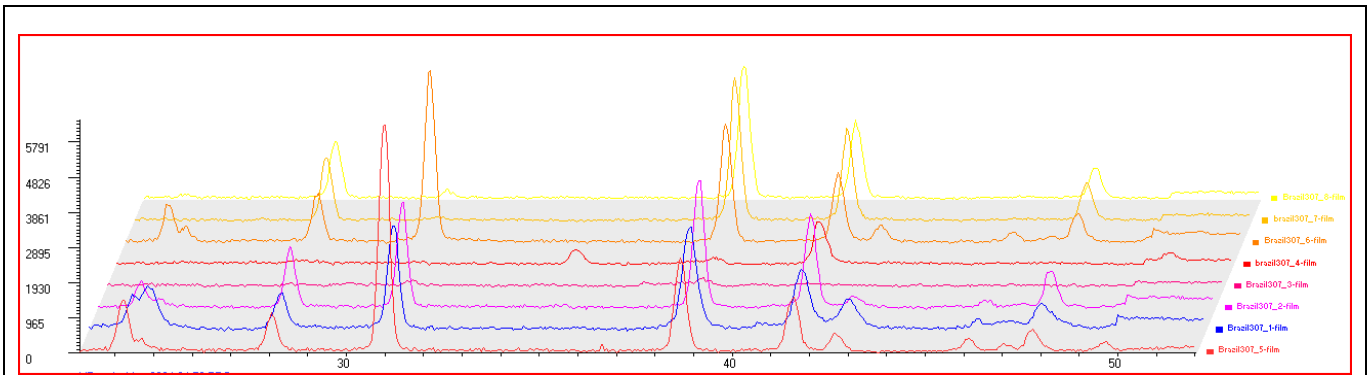




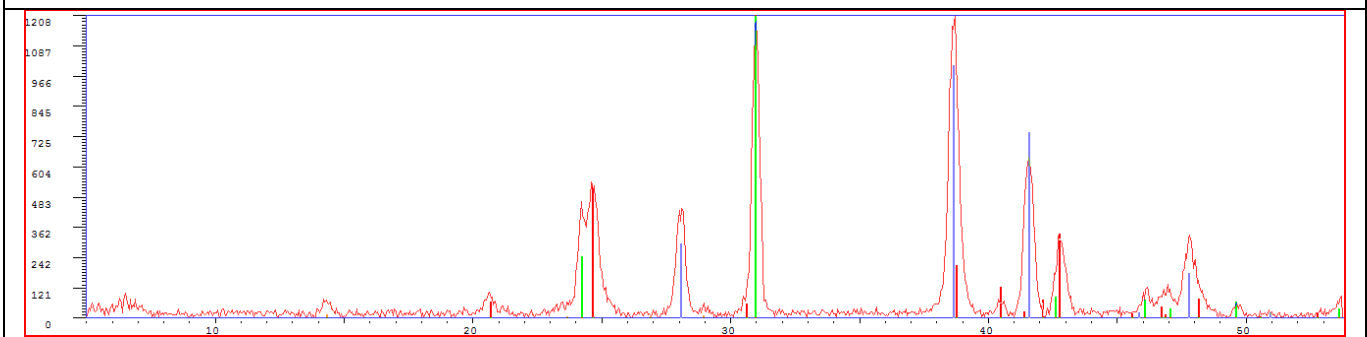
Summary: Eight Iron rich ore samples taken from a mine in Brazil for analysis in the Terra XRD/XRF. The samples were ground and sieved to less than 150um. Approximately 20mg of each sample was then loaded for the analysis and a twenty minute acquisition produced the diffractograms below. The analysis was performed with a cobalt target X-ray tube, operating at 30Kv and 300uA. Once the diffractogram was generated the pattern was imported into the application *Xp powder* for analysis. After the phases are identified we are able to quantify and determine the amount of each phase in the samples. The compositions of the samples are represented in the table below, showing RIR(Reference Intensity Ratio) values, generated by *Xp powder*.

Mineral	Samples							
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8
Quartz	52.7	57.6	19.1	n/a	73.3	70.8	n/a	8.4
Hematite	26.3	40.4	10.7	16.5	26.7	27.2	100	91.6
Goethite	18.9	2.1	4.3	1.5	n/a	2	n/a	n/a
Magnetite	n/a	n/a	n/a	70.7	n/a	n/a	n/a	n/a
other	2.1	n/a	66	11.4	n/a	n/a	n/a	n/a

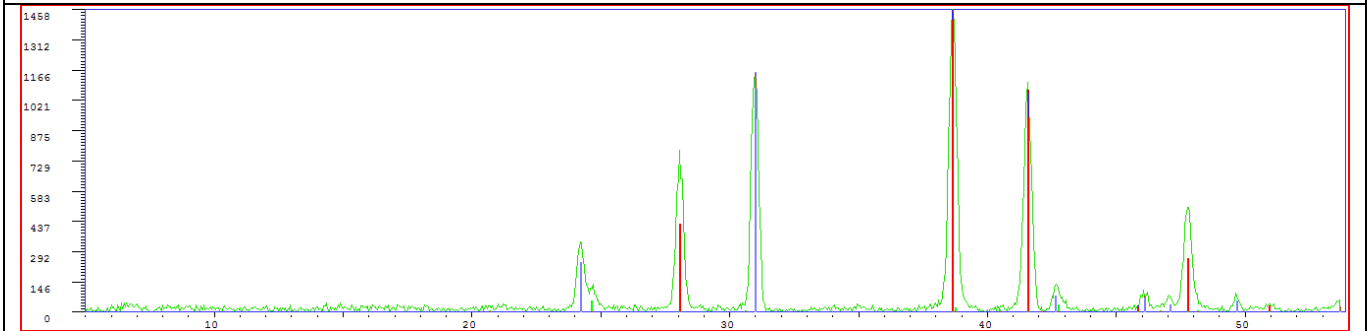
Comments: This application requires the identification of various Iron oxides that could be present in a mining operation. The Iron rich phases produce distinctively different diffraction patterns that can easily be identified. With little setup one can automatically generate quantitative compositions of the samples analyzed even when certain phases are completely absent. When other phases are present it is a simple task to identify those peaks that are not of the iron oxides and add them to the compositions.



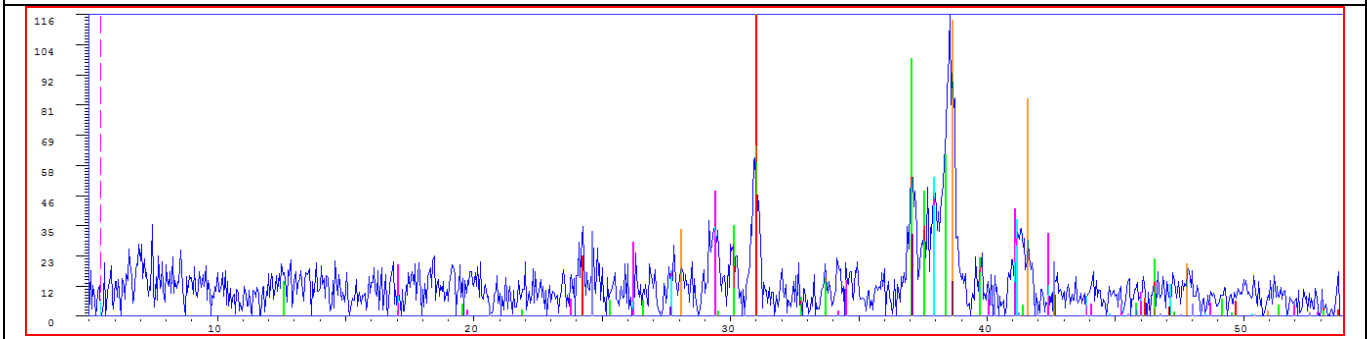
All samples in waterfall stack



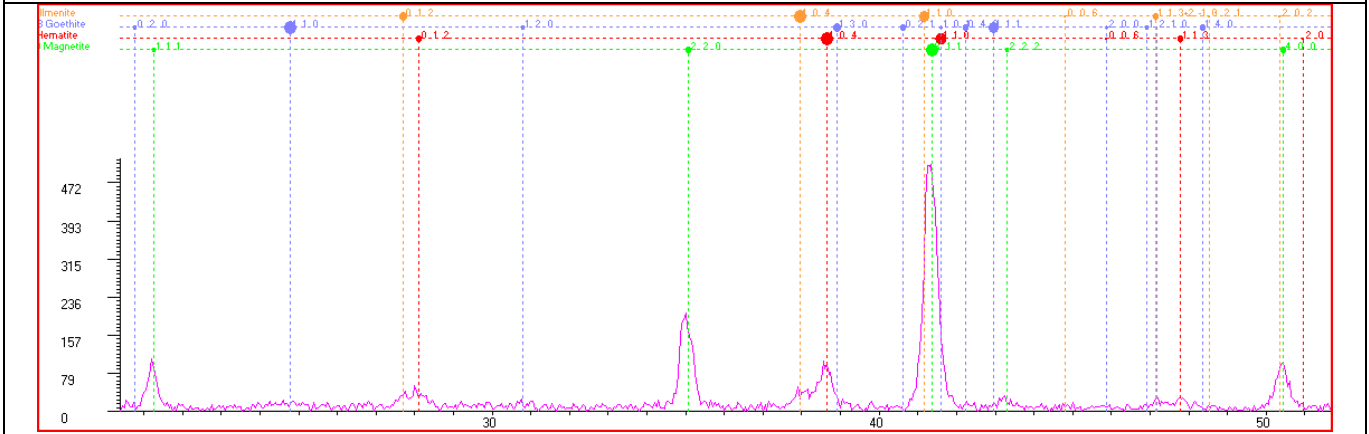
Sample 1 with major phases identified



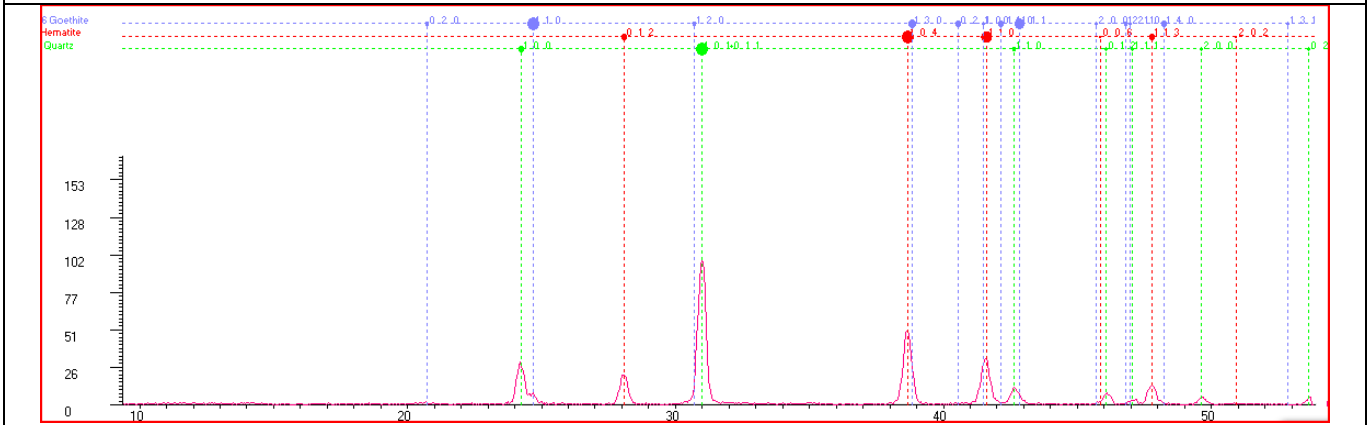
Sample 2 with major phases identified



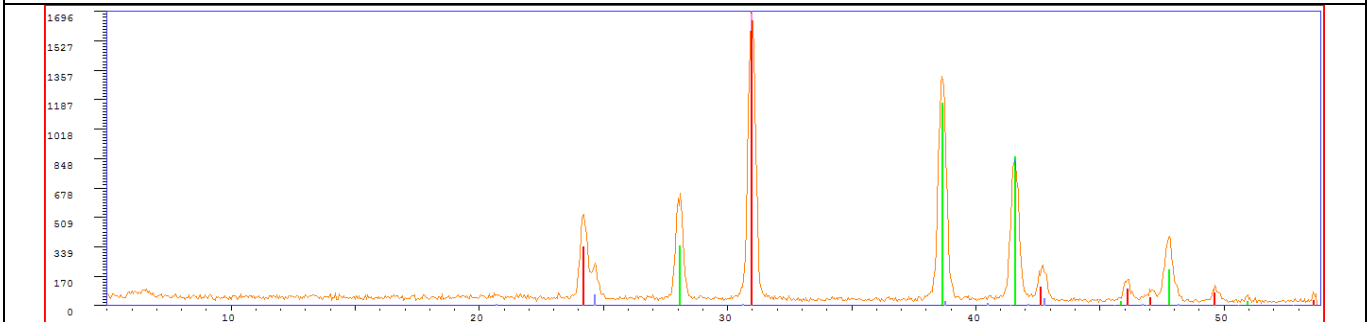
Sample 3 with major phases identified



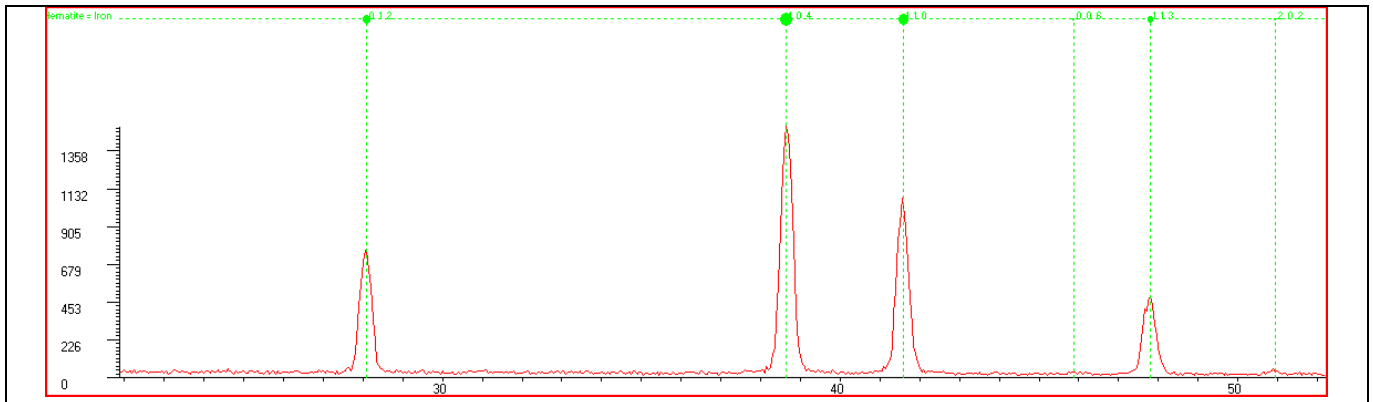
Sample 4 with major phases identified



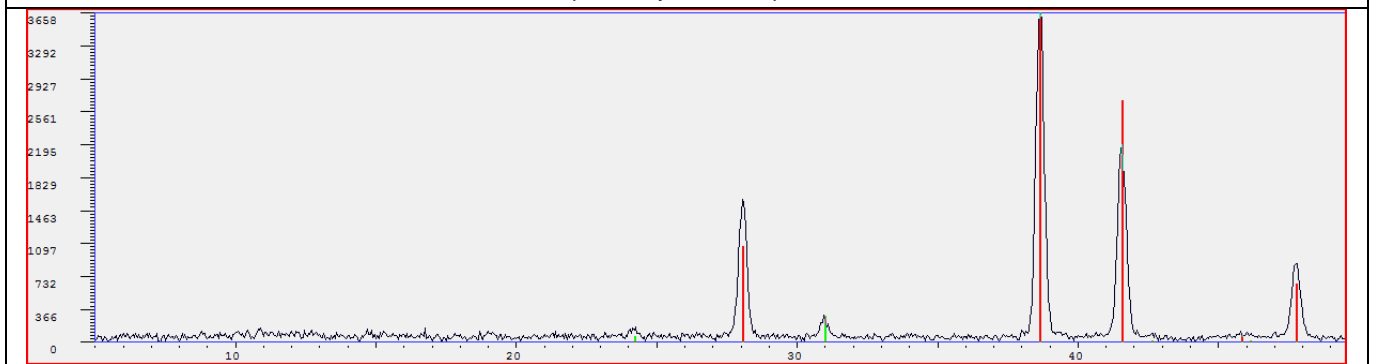
Sample 5 with major phases identified



Sample 6 with major phases identified



Sample 7 only Hematite present



Sample 8 Hematite and quartz identified