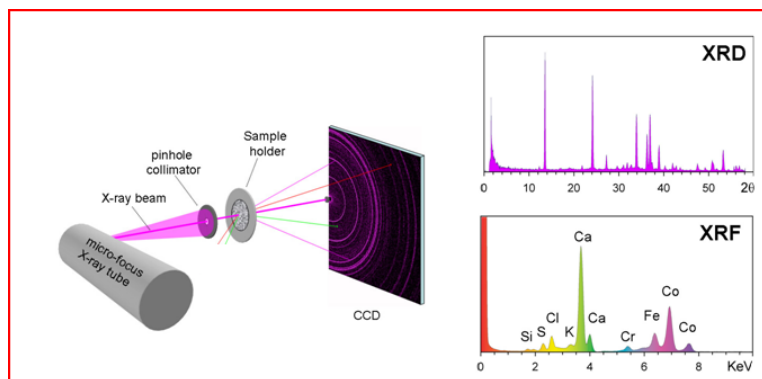


Title: Rapid identification and quantitative analysis of suspected hazardous materials

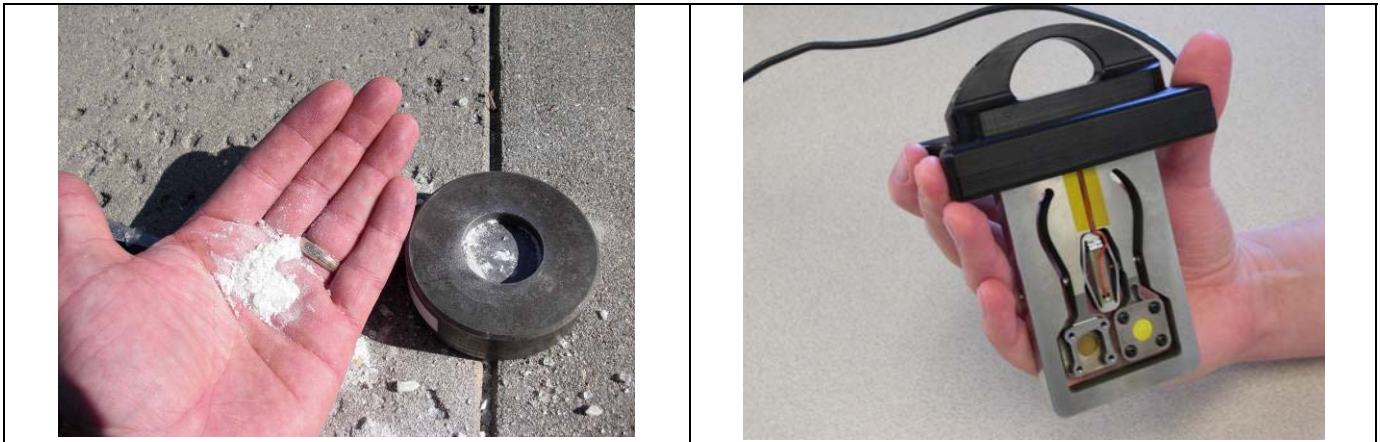
Introduction: The inXitu Terra combined XRD/XRF instrument utilizes a patented method for rapid and easy collection and processing of XRD data. With only ~15mg of sample, Terra is able to collect the entire practical two-theta range simultaneously. With no mechanical goniometer or associated moving parts, 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 passed through a 120-140 mesh sieve and inserted into the patented sample chamber as shown below. In some cases, the pill was first crushed using a simple mortar/pestle and then passed through the sample sieve.

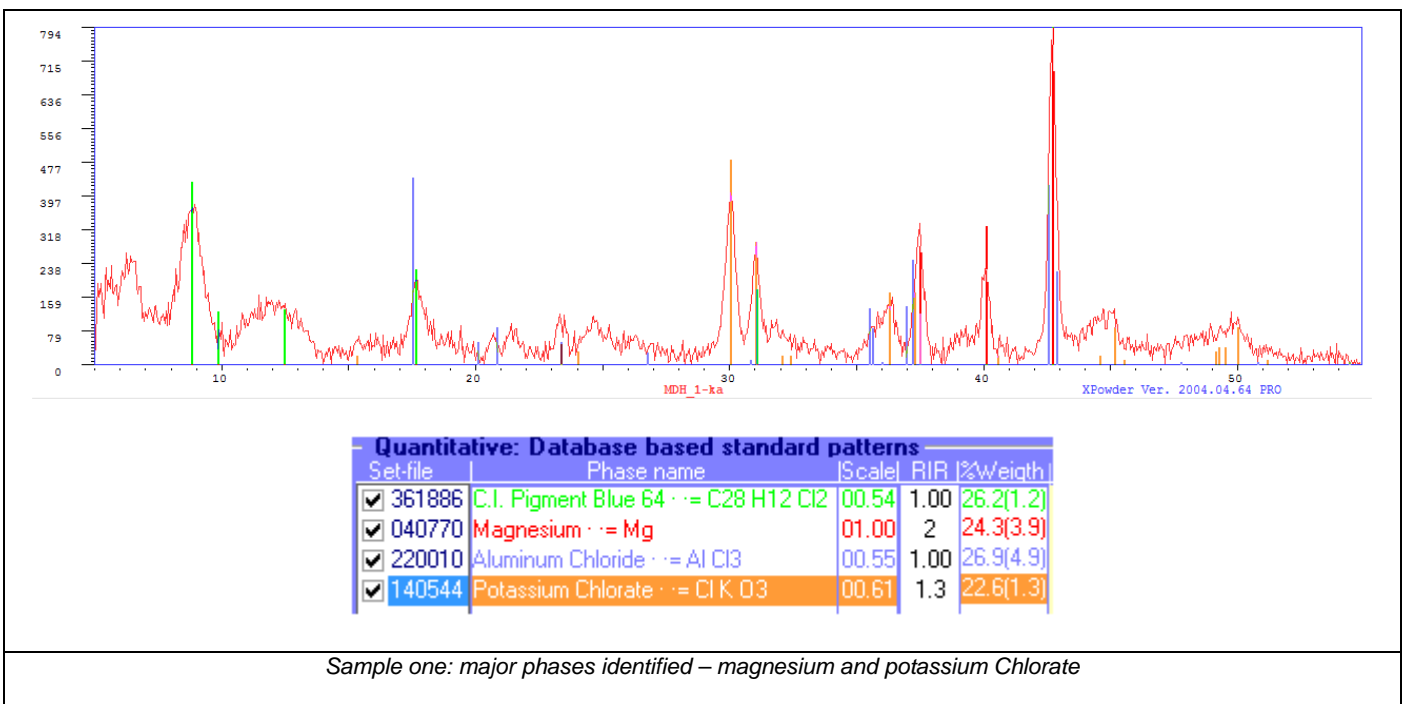


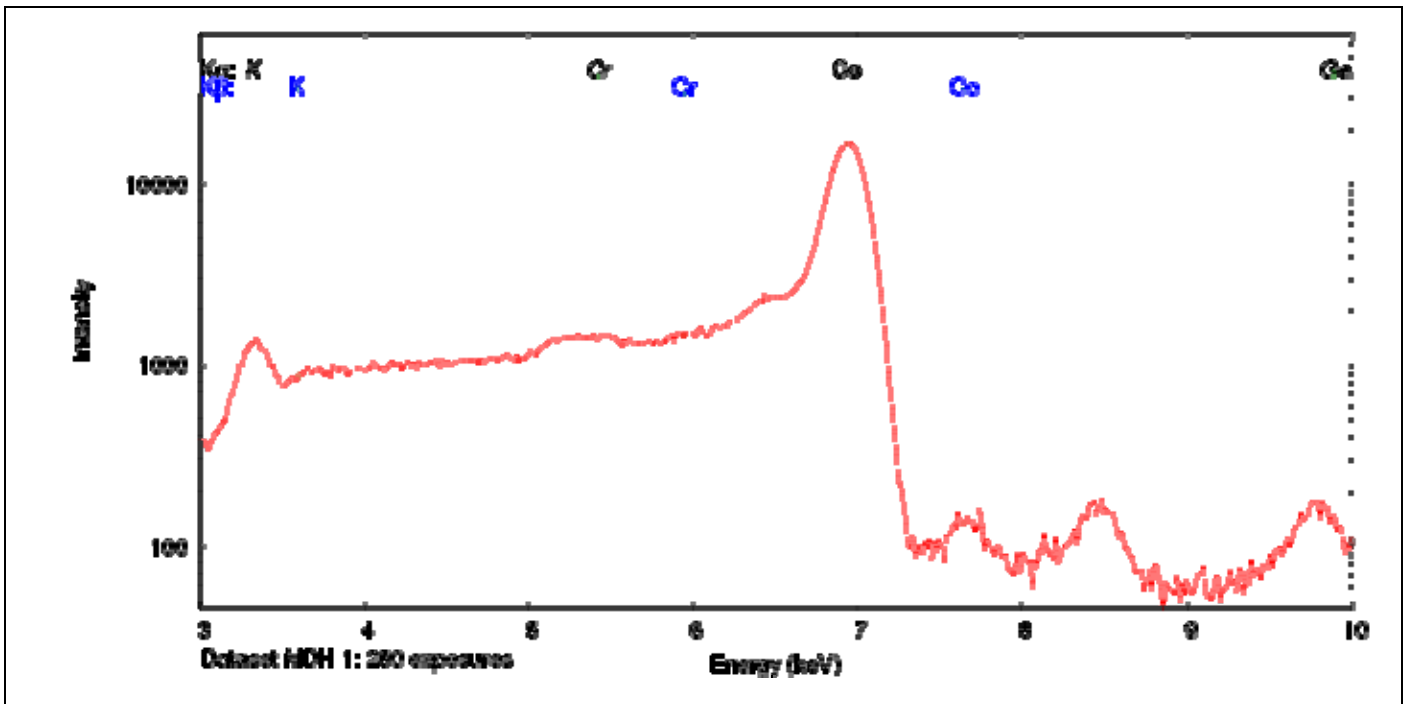
Terra at Work



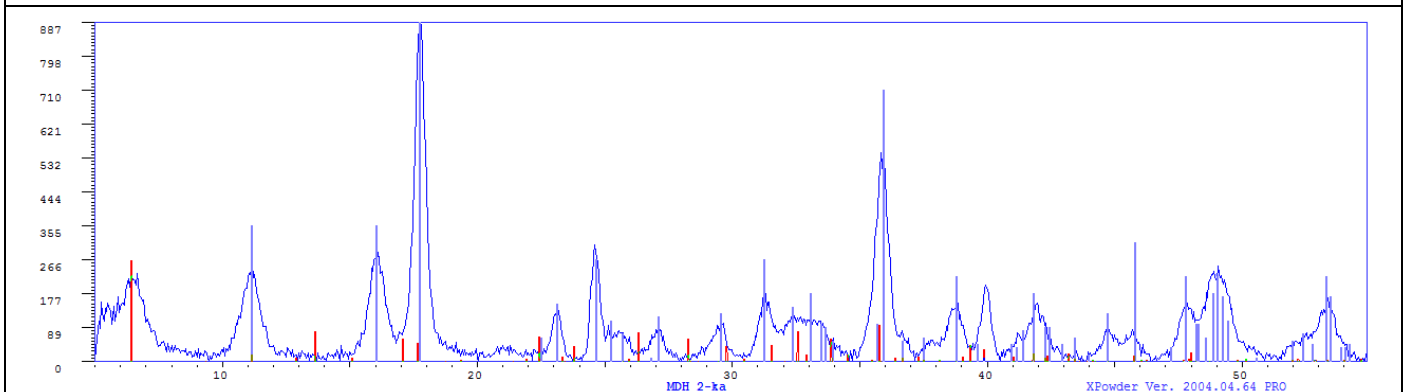
Summary: The InXitu Terra XRD/XRF instrument was used to analyze 5 samples of various suspected hazardous materials. Each sample was analyzed for approximately five minutes with some requiring a slightly longer analysis time of ten minutes. From this, the resulting diffraction pattern was processed through the supplied search/match software which is standard with Terra.

Comments: This is an ideal application for the inXitu Terra. Very little, if any, sample preparation was required and the analysis times were quite short due to the low density of the material combined with the intrinsic high diffraction efficiency of the compounds found. In only a few minutes, Terra was able to rapidly identify the suspected materials.



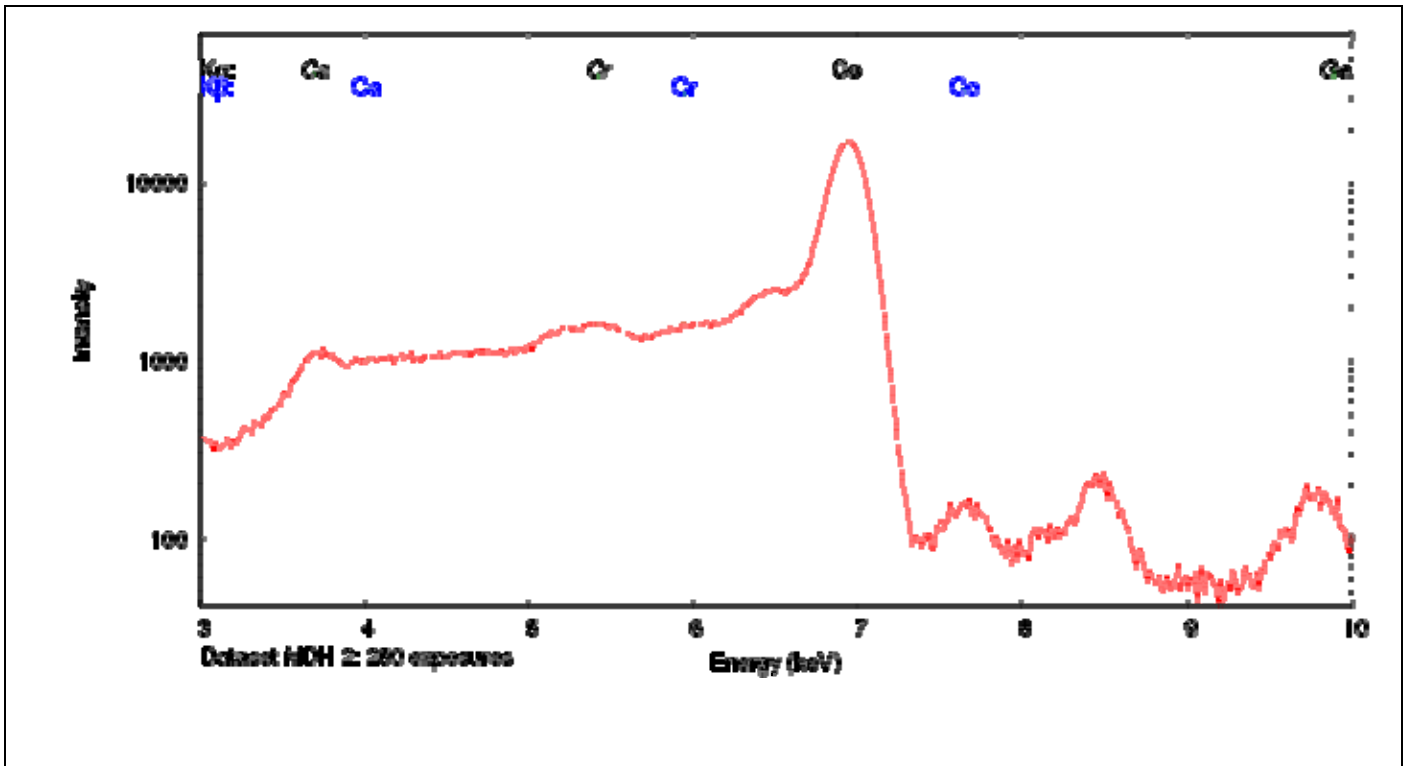


Sample one: XRF spectrum – note identification of potassium in sample. (NB – Co peak is from X-ray tube target)

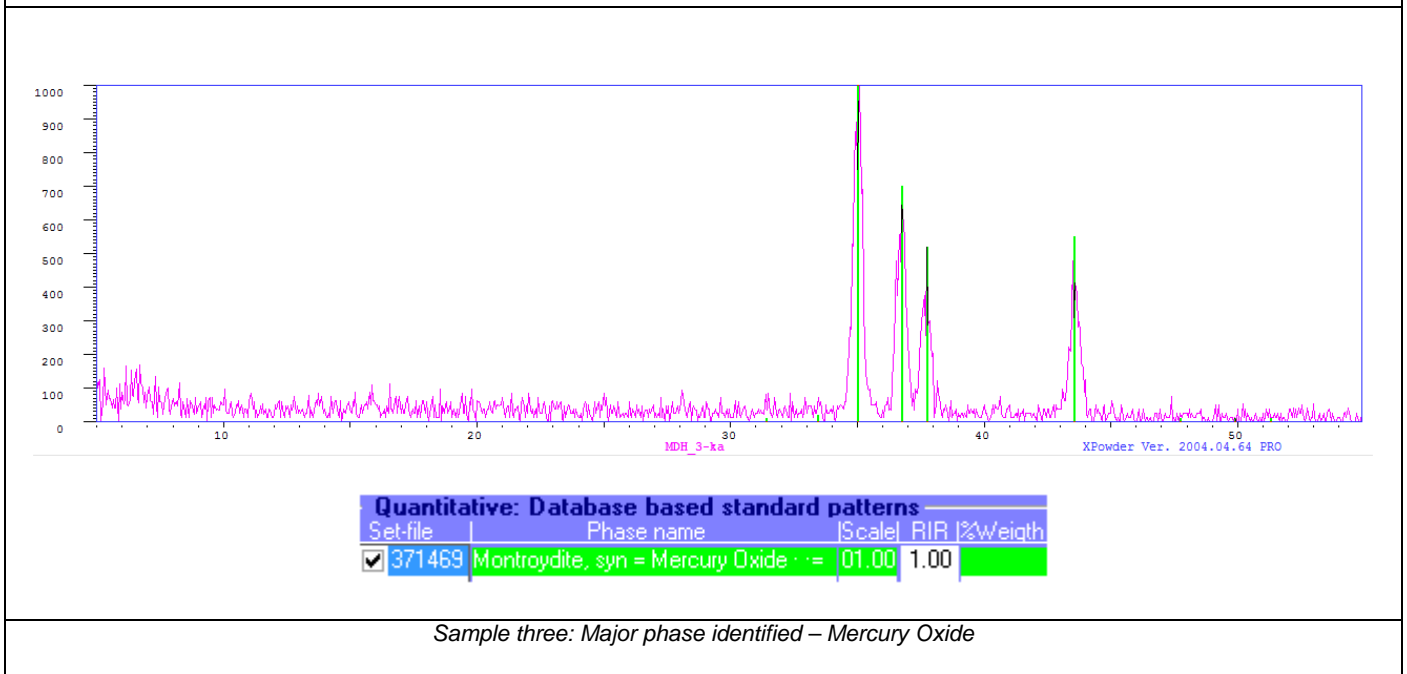


Quantitative: Database based standard patterns				
Set-file	Phase name	Scale	RIR	%Weight
<input checked="" type="checkbox"/> 380470	Hibonite-5\ITH\RG, syn = Calcium	00.01	1.00	00.4(1.0)
<input checked="" type="checkbox"/> 390224	Potassium Sodium Aluminum Silicate	00.30	1.00	12.2(1.8)
<input checked="" type="checkbox"/> 250513	Hydromagnesite = Magnesium	01.00	0.473	87.4(7.9)

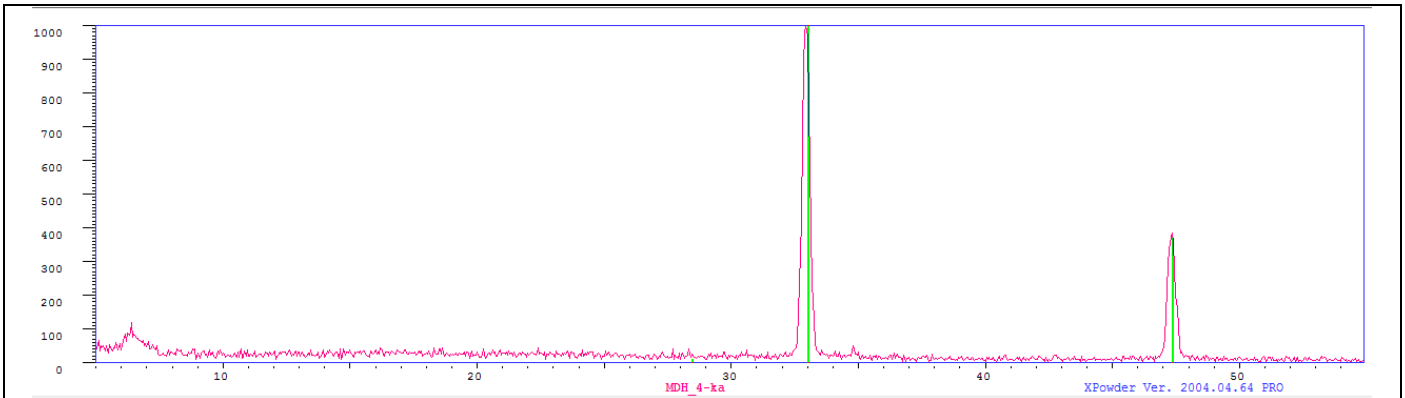
Sample two: Major phase identified – hydromagnesite (most common industrial use is as a fire retardant additive for polymers)



Sample two XRF spectrum

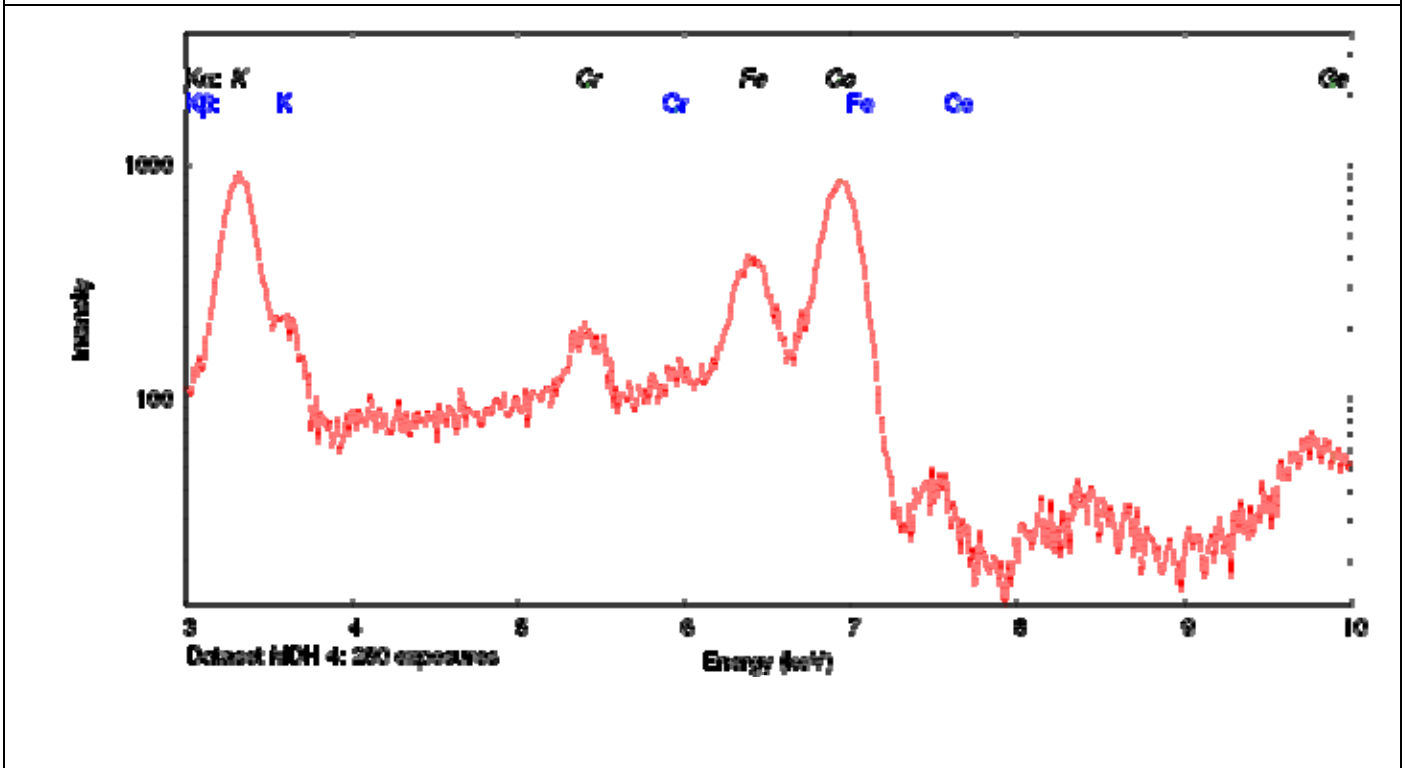


Sample three: Major phase identified – Mercury Oxide

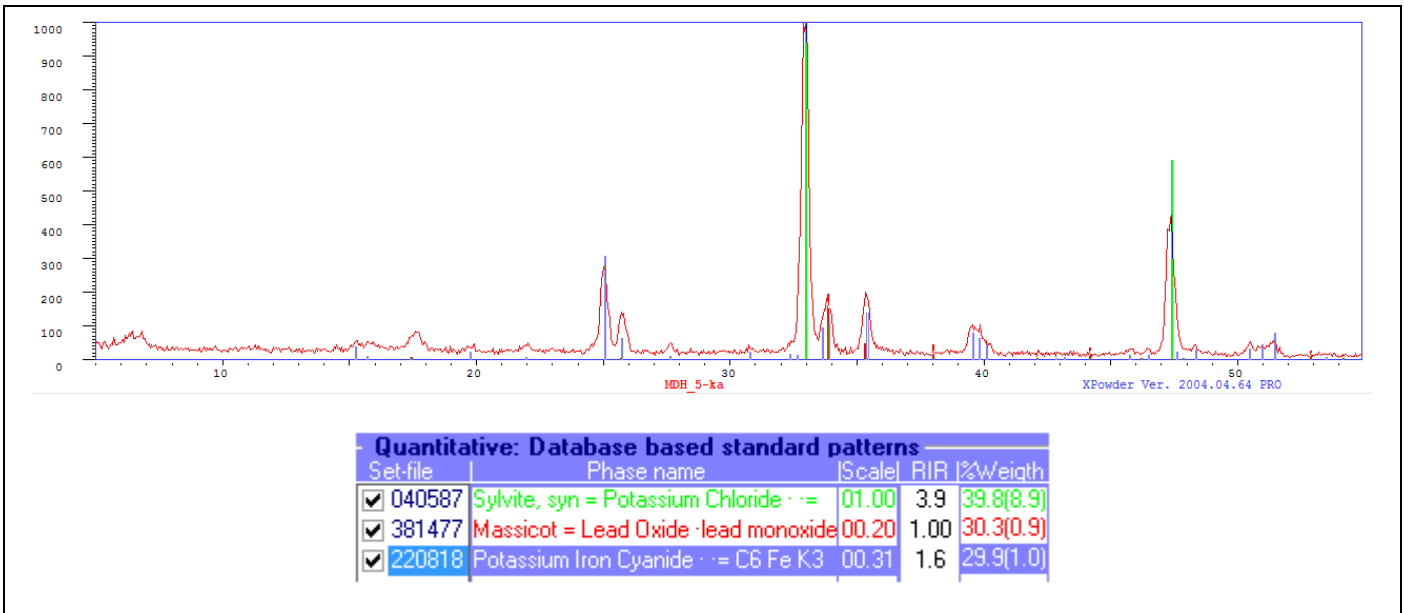


Quantitative: Database based standard patterns			
Set-file	Phase name	Scale	RIR I
<input checked="" type="checkbox"/> 411476	Sylvite, syn = Potassium Chloride	01.00	1.00

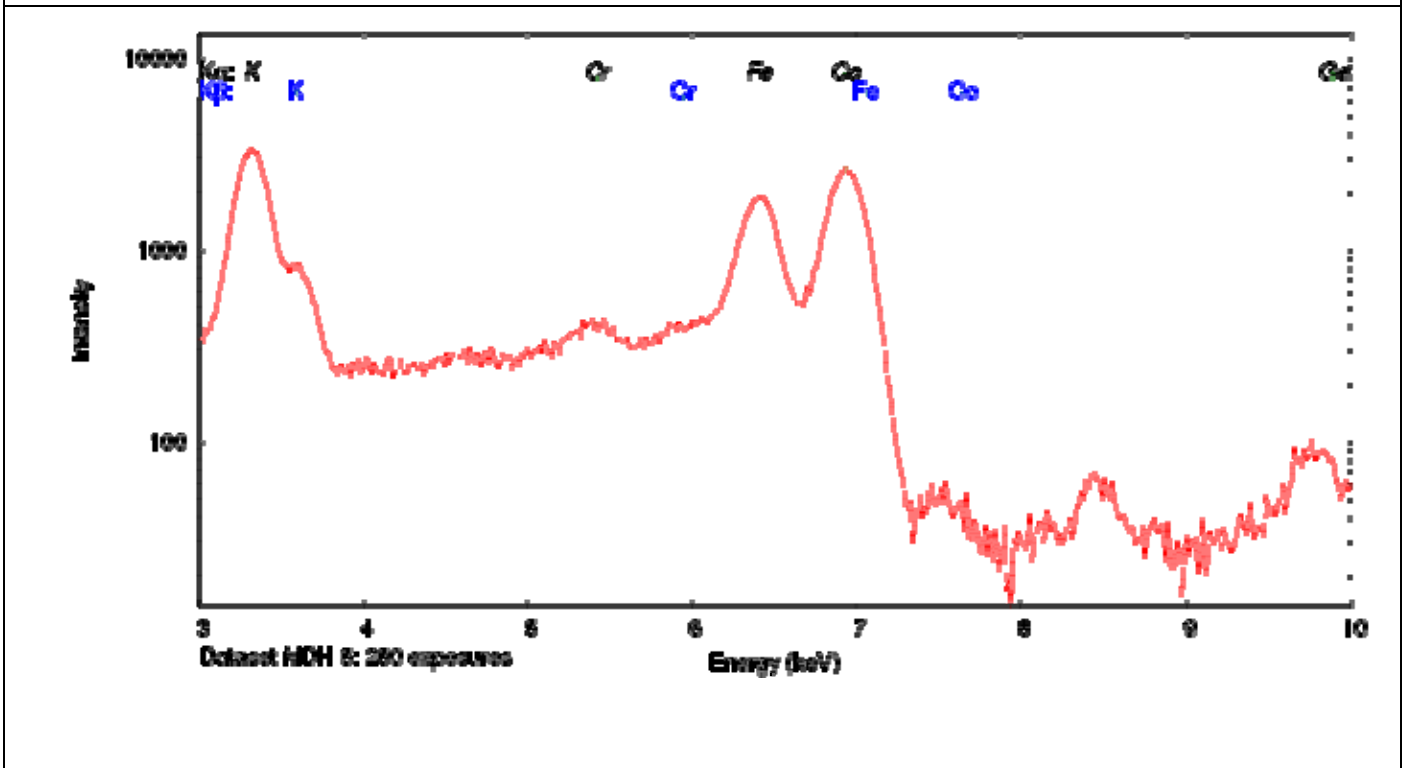
Sample Sample three: Major phase identified – Sylvite (KCl)



Sample four – XRF spectrum



Sample five: Major phases are Sylvite , Potassium Iron Cyanide and Lead Oxide



Sample five – XRF spectrum