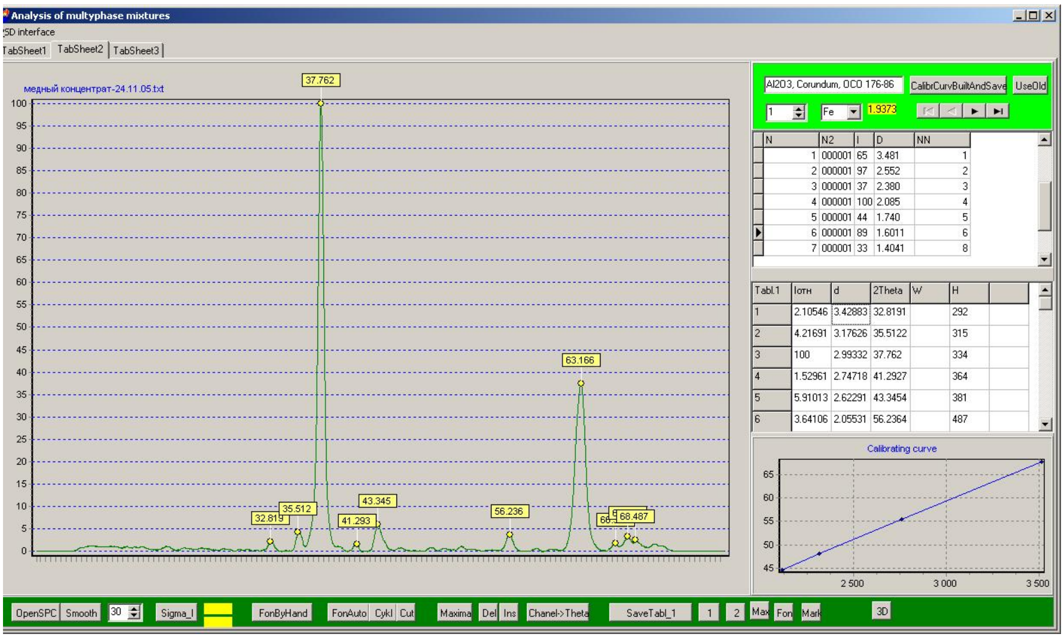
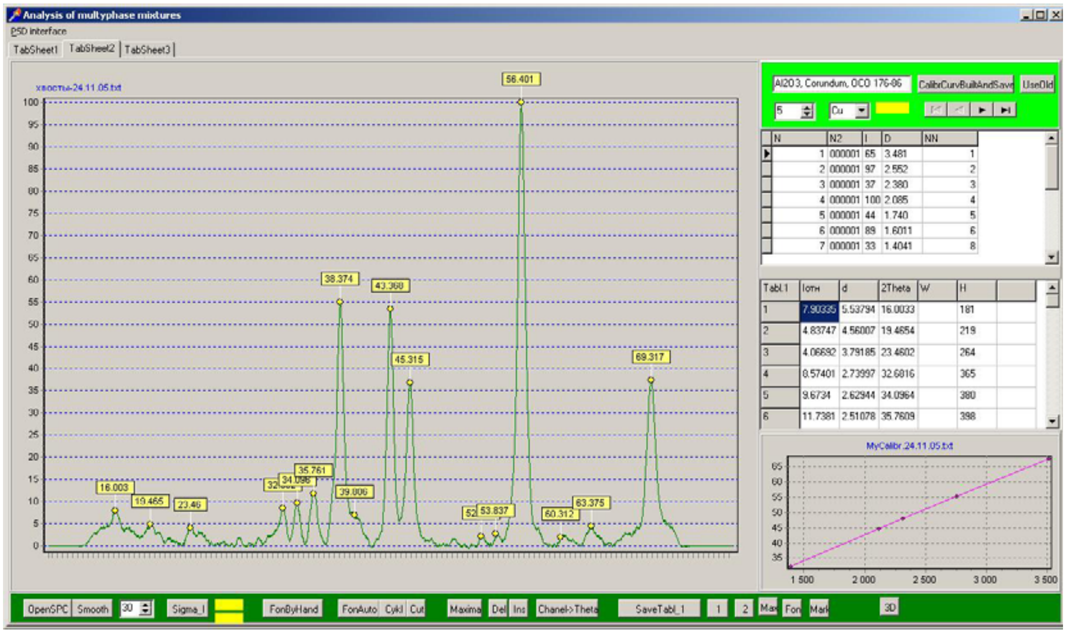
Mining

(1) Norilsk Mining Enterprise

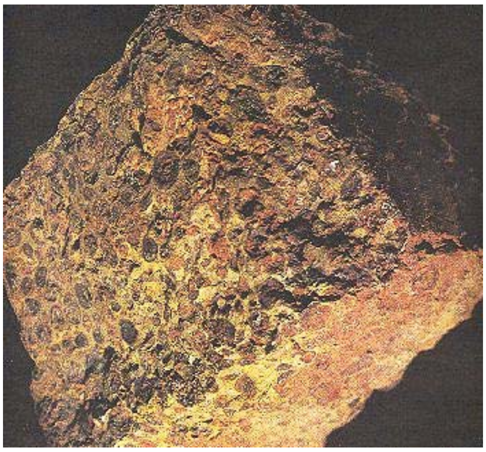


Copper concentrate from Norilsk



Diffractogram of a sample taken from the waste pile after enrichment of copper ore from Norilsk

(2) Bauxites



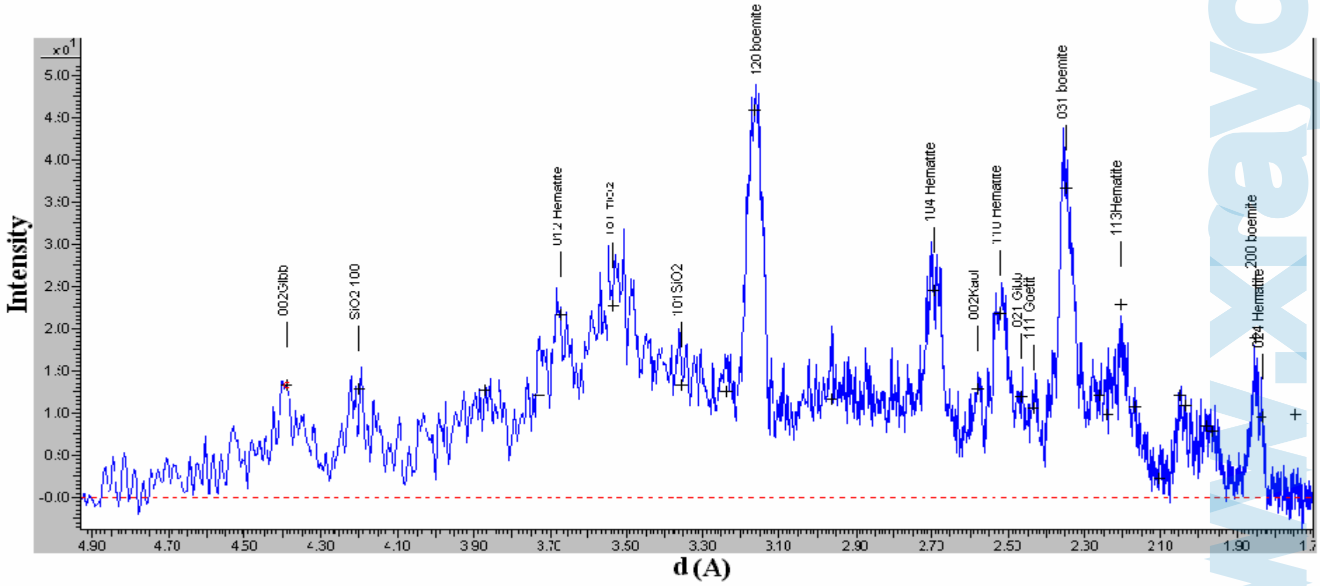
Bauxite consists mostly of alumina hydrates, ferrum oxides with admixture of other mineral components

The main chemical component of bauxite is alumina (Al_2O_3) (28 - 80%); its permanent component is ferrum oxide (Fe_3O_3); and the most poisonous admixture is silica (SiO_2).

Among other admixtures there are: titanium dioxide (TiO_2), calcium oxide (CaO), magnesium oxide (MgO), manganese oxide (MnO), phosphorus pentoxide (P_2O_5), etc.

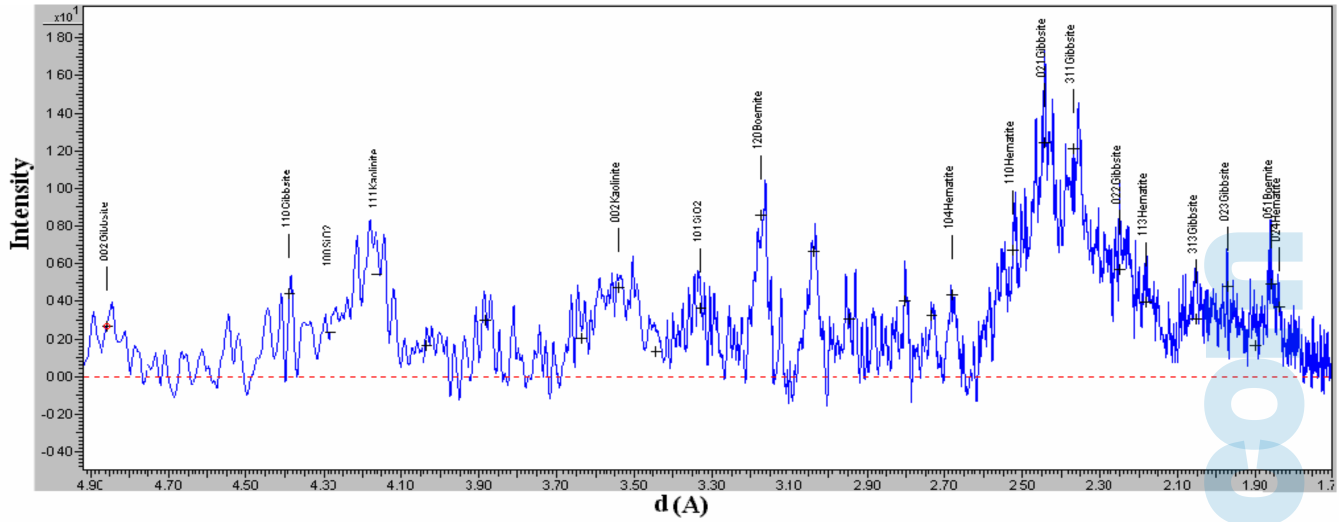
Qualitative phase analysis was performed for the bauxite samples kindly provided to us by Dr. Krishnan from JNARDDC, Nagpur. Gibbsitic bauxites from India belong to high-quality low-silicon bauxites

FBST-F4.



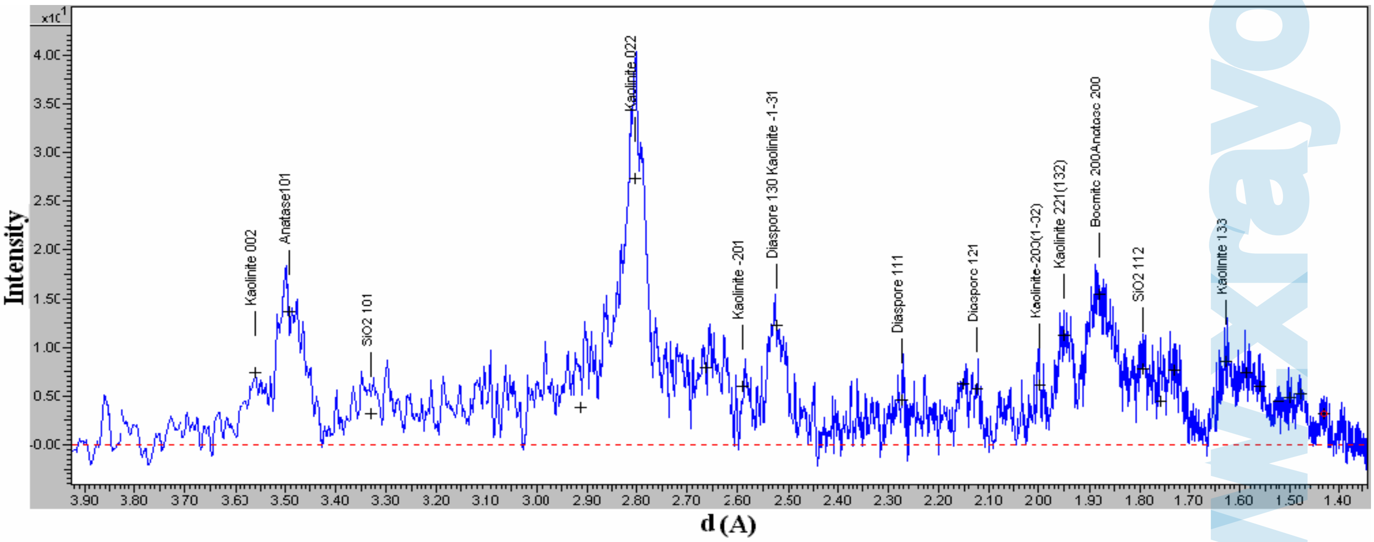
The main phases observed are: Boemite, Gibbsite, Hematite, SiO2.

FBST-K1



The main phases observed are: Boemite, Gibbsite,Kaolinite, SiO2.

H73-10

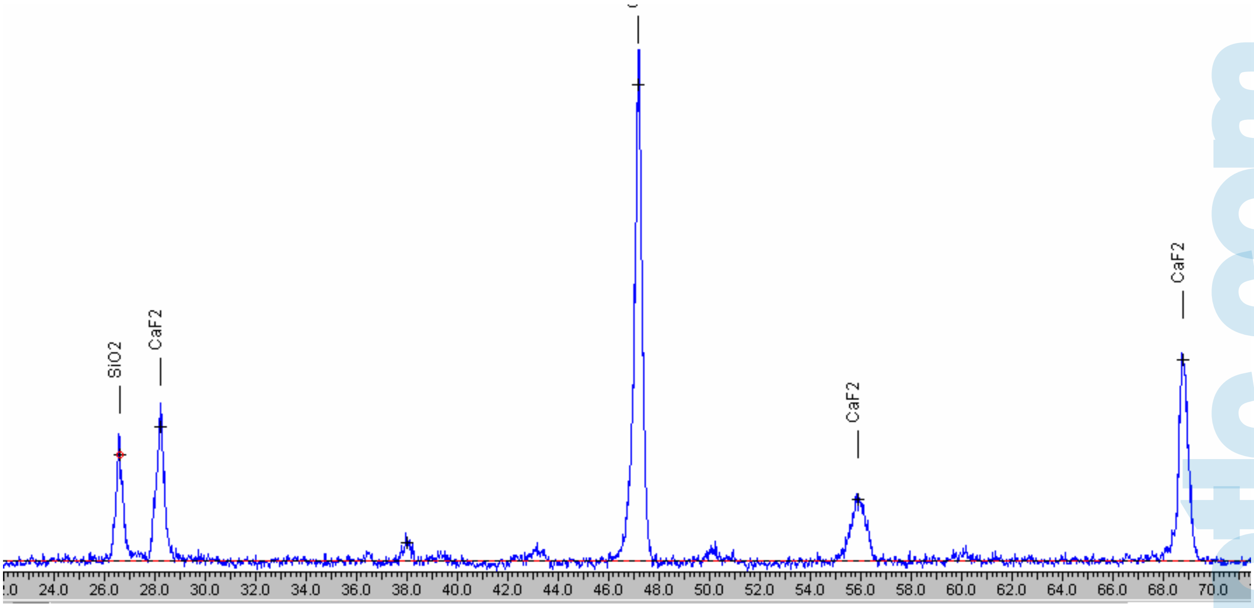


The main phases observed are: Boemite, Gibbsite,Anatas, Kaolinite, SiO2.

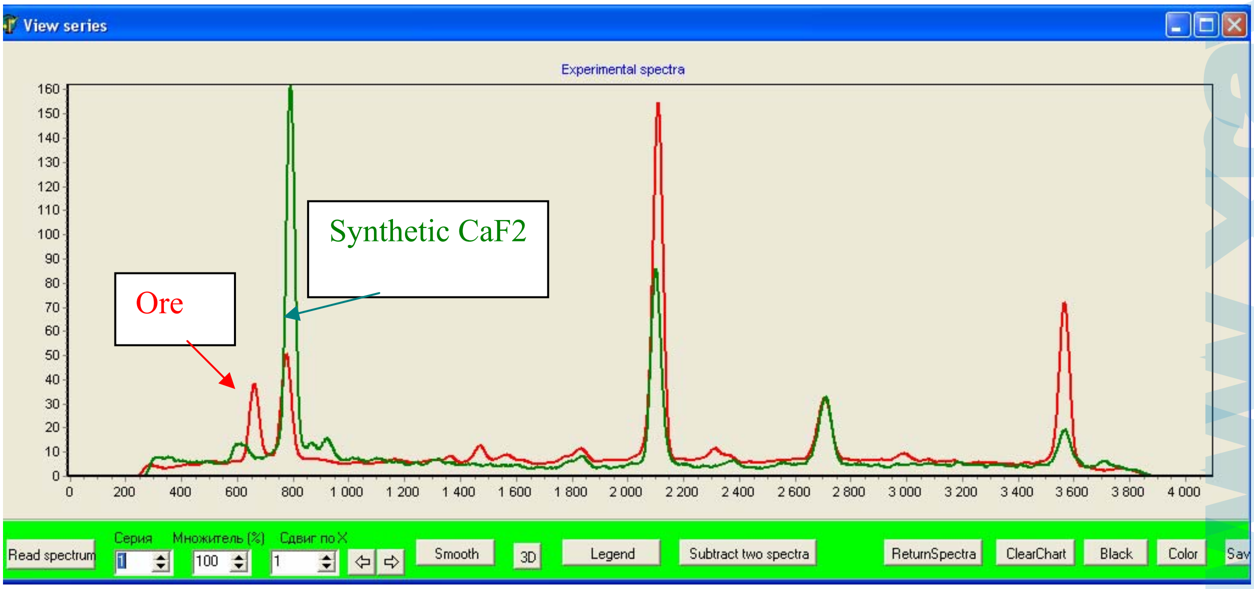
(3) Fluorites (fluor-spar)

Fluorite is used as flux in production of aluminum, also as a source of various fluoride compounds.

Fluorite ore analysisл (chemical analysis – 75% CaF2 plus array consisting mostly of SiO2)

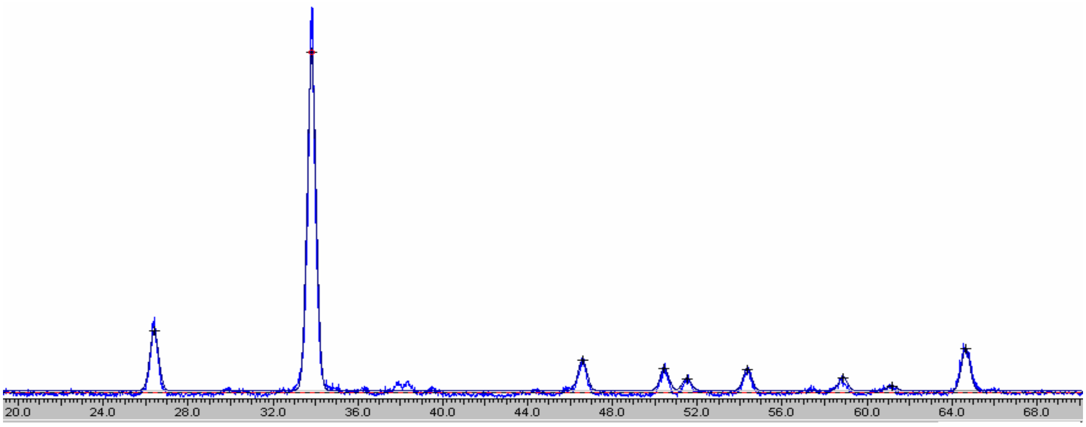


Comparison of fluorite ore and synthetic CaF2.

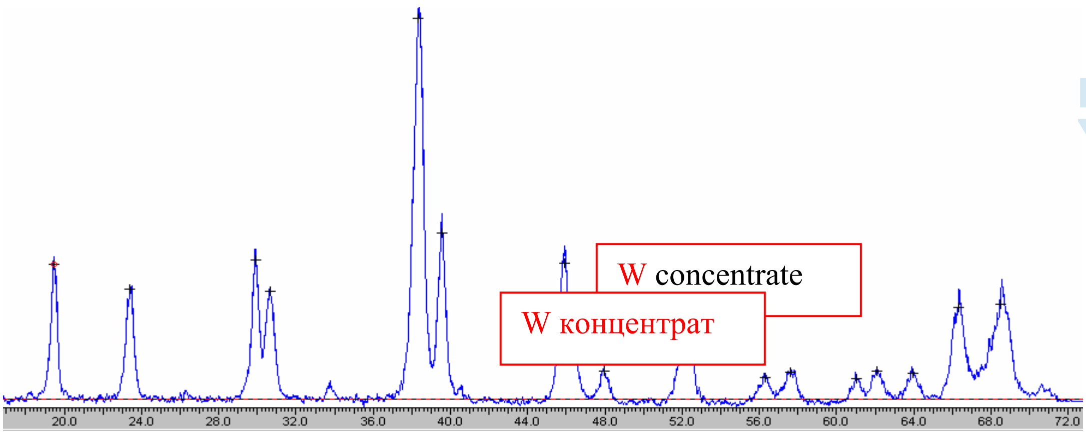


One can see that while lines positions match well, there is no correspondence in correlation of fluorite lines' intensities, which indicates ore sample texturing .

(4) Tungsten Ores



A fragment of W ore diffractogram taken with Fe radiation



A fragment of W concentrate diffractogram.

Comparison of diffractograms of W ore and concentrate. Strengthening of WO3 diffraction lines and drastic weakening of slag lines in the W concentrate diffractogram are evident.