

**Objective:**

The Powder Diffraction Cluster is a facility for the examination of crystalline or partially crystalline powdered material or glass. The facility is available for routine phase identification or more complex quantitative analysis or structure refinement.

**Instrumentation:**

1. Siemens D-500 X-Ray Diffraction System
2. Nicolet/Stoe Model X-Ray Diffraction System

**Computing Equipment:**

Matrix Computer System Enlig-EN66800M3 with monitor, Win NT 4.0 Workstation.

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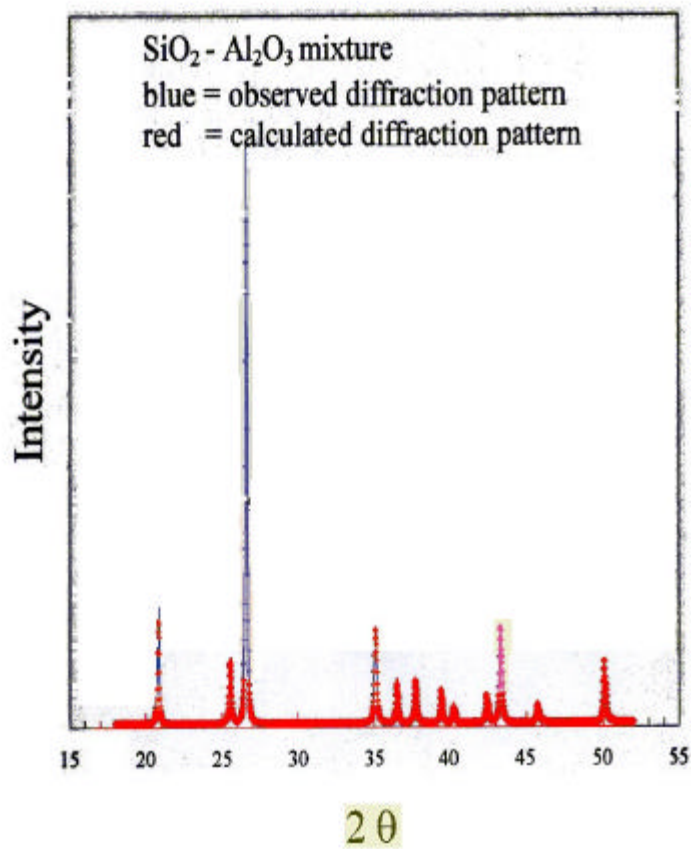
## **Powder X-Ray Diffraction Facility of the Materials Research Instrument Facility (MRIF)**

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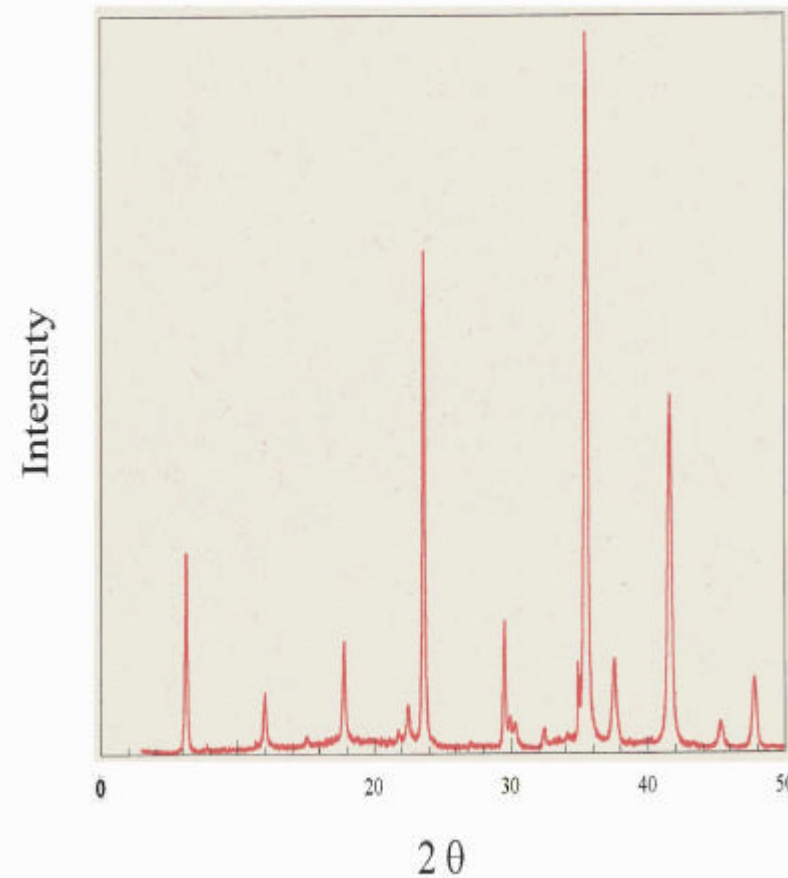
Quantitative Analysis of a Mixture



Siemens D-500 X-Ray Diffraction System

There are two diffractometers in this cluster. One is a Siemens D500 run by a PC-based operating system and data collection and analysis software. The data analysis software include the ICDD inorganic and mineral data set for phase identification. We have the ability to determine the quantitative proportions of multiphase mixtures using a Rietveld approach. We also can refine the structure of single phase samples and, if the elements have sufficiently different scattering of X-rays, determine the chemical composition of single phases.

The second unit is a Nicolet transmission diffractometer equipped with a position-sensitive detector. This unit is used for fiber, films and extremely small samples. We will be upgrading the computer and software in the near future. Presently, a VAX computer operates the diffractometer.



Thin Film on a Crystalline Substrate