Variable Angle XRF and XRD Studies Using a Lab-based Instrument

A Siemens D500 XRD has been configured to allow for both x-diffraction and variable angle x-ray fluorescence analysis using the same x-ray source and goniometer. To show the usefulness of this tool across multiple disciplines measurements were conducted on both multilayered semiconductor samples fabricated by reactive magnetron sputter deposition, as well as Archaeological Artifacts consisting of both animal teeth and pottery sherds recovered from various archaeological excavations in both North America and Africa. In both material systems we were able individual layers of material, be it semiconductor or dentate, were able to be characterized by using the incident angle to vary the penetration depth of the beam. Such an ability allows any researcher to construct a low-cost facility capable of both elemental and structural characterization.