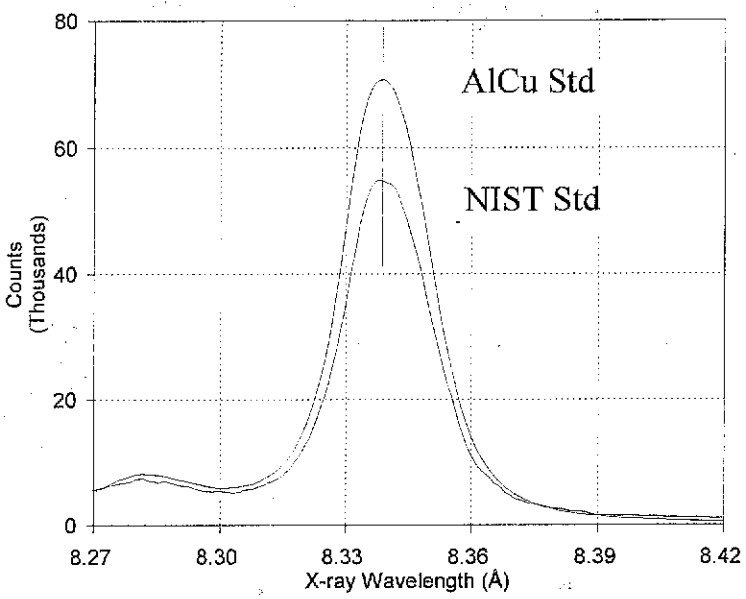
GELLER
MICROÅNALYTICAL
LABORATORY
426e BOSTON ST., TOPSFIELD, MA 01983-1216
TEL 978 887-7000 FAX 978-887-6671
Jg@gellermicro.com http://www.gellermicro.com

Certified to ISO-9001 and 17025

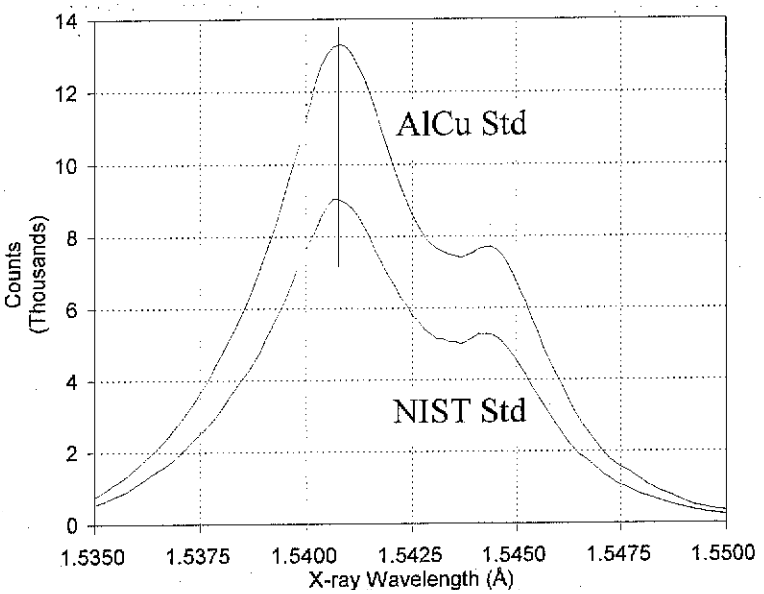
March, 2003
Al-Cu Std

Al-Cu NIST Traceability

Al in NIST Standard SRM 654b vs. Al in Cu-Al



Cu in NIST SRM 1104 vs. Cu in Al-Cu



Al wavelength is 8.33934 ± 0.00092 Å.
Al energy is 1486.7 ± .014 eV.

Cu wavelength is 1.5456 ± 0.0014 Å.
Cu energy is 8047.78 ± 1 eV.

This document certifies the attached Cu-Al standard, manufactured by Geller MicroÅnalytical Laboratory of Cu and Al powder grains is within the above stated wavelength and electron energies relative to NIST standards 1104 and 654b. All measurements made with a JEOL wavelength dispersive x-ray spectrometer using the TAP crystal for aluminum and LIF crystal for copper.

Joseph D. Geller
Proprietor

GELLER
MICROANALYTICAL
LABORATORY
426e BOSTON ST., TOPSFIELD, MA 01983-1216
TEL 978 887-7000 FAX 978-887-6671
Jg@gellermicro.com http://www.gellermicro.com

Certified to ISO-9001 and 17025

March, 2003
Al-Cu Std

INSTRUCTIONS

Aluminum - Copper X-ray Calibration Standard

Purpose:

This standard is used for energy calibration of energy dispersive x-ray detectors employing electron beam excitation. The recommended peaks for calibration are the AlKα and CuKα.

Construction:

The standard is a polished, powder metallurgy composite material (not diffused) of large grain high purity aluminum and copper powders. The Al-Cu standard is 3mm diameter by ½ mm thick.

Usage:

The method preferred among EDX manufacturers relies upon measuring the energies of the sharp natural linewidths of the AlKα* (1.486keV) and CuKα_1* (8.04778keV) and CuKα_2* (8.02783) x-ray transitions. Since the two Cu transitions cannot be resolved we recommend using an energy of 8.040keV. Electron beam excitation conditions can be chosen from about 10keV and higher. The excitation energy used will result in large relative intensity changes for these widely separated x-ray transitions. By selecting the area fraction of each element excited by the electron beam the Al and Cu x-ray peak intensities can be balanced- allowing for easier and more accurate calibration. The area fraction of aluminum and copper exposed by the electron beam can be varied by increasing magnification to the point where only a few particles are imaged (the copper particles will normally appear brighter when imaged using both secondary and backscattered electrons). By now translating the specimen under the electron beam excited area the proportion of Al and Cu in that area fraction will change resulting in more or less Cu or Al fluoresced.

Adjustments (either electronic or in software) vary according to the manufacturer. Calibration should initially be done on a daily basis until a pattern of stability is established. As a rough guide, accuracy of the calibration necessary for quantitative analysis requires peaks to be within 1 channel (5 or 10eV).

* These values are from National Institute of Standards & Technology, Gaithersburg, MD 20402, "X-ray Wavelengths and X-ray Atomic Energy Levels", Publication NSRDS-NB 14, Sept.,
1967.