

Applications of LoMaX

Parallax Research, Inc.
Box 12212, Tallahassee, FL 32317
phone: 850-580-5481 • fax: 850-668-4133
www.parallax-x-ray.com • prlax@mindspring.com

The LoMaX low-energy gain is useful in boosting the detection limit of sample constituents with low-energy signatures. Often EDS is limited to applications using higher energy K lines due to the low-energy inefficiency of EDS—even with “light element” systems. This demands the use of higher electron beam energies which results in a larger analysis volume probed.

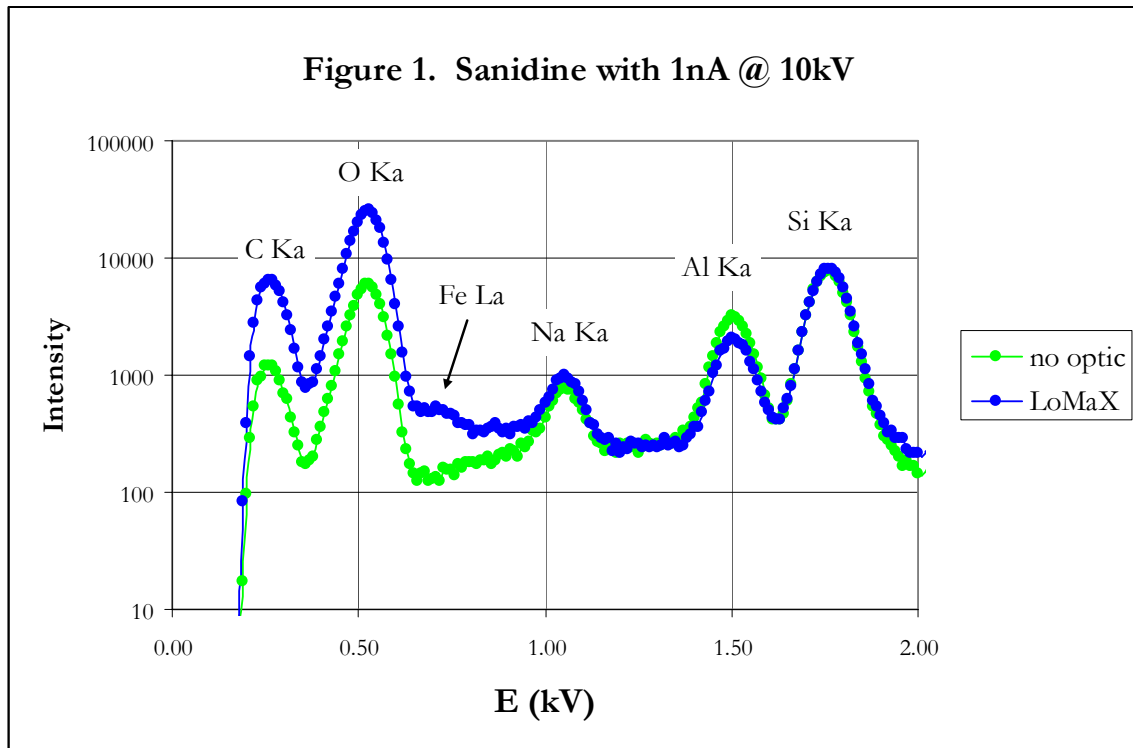


Figure 1 above shows data taken on the alkali feldspar mineral sanidine with 1nA and 10kV with and without LoMaX low-energy enhancement. The mineral specimen is polished and coated with ~ 20 nm of carbon to suppress charging. The unity gain of the LoMaX optic above 1keV is clearly evident. Of interest are the gain of ~ 6.5 for C K_α at 282 eV and a gain of almost 5 for O K_α at 523 eV.

Of particular interest is the Fe L_α signature of iron. Due to the low energy inefficiency of EDS this trace contaminant is not detectable in the standard EDS data. With the LoMaX this contaminant which comprises ~ 0.15% atomic of the specimen is detectable.

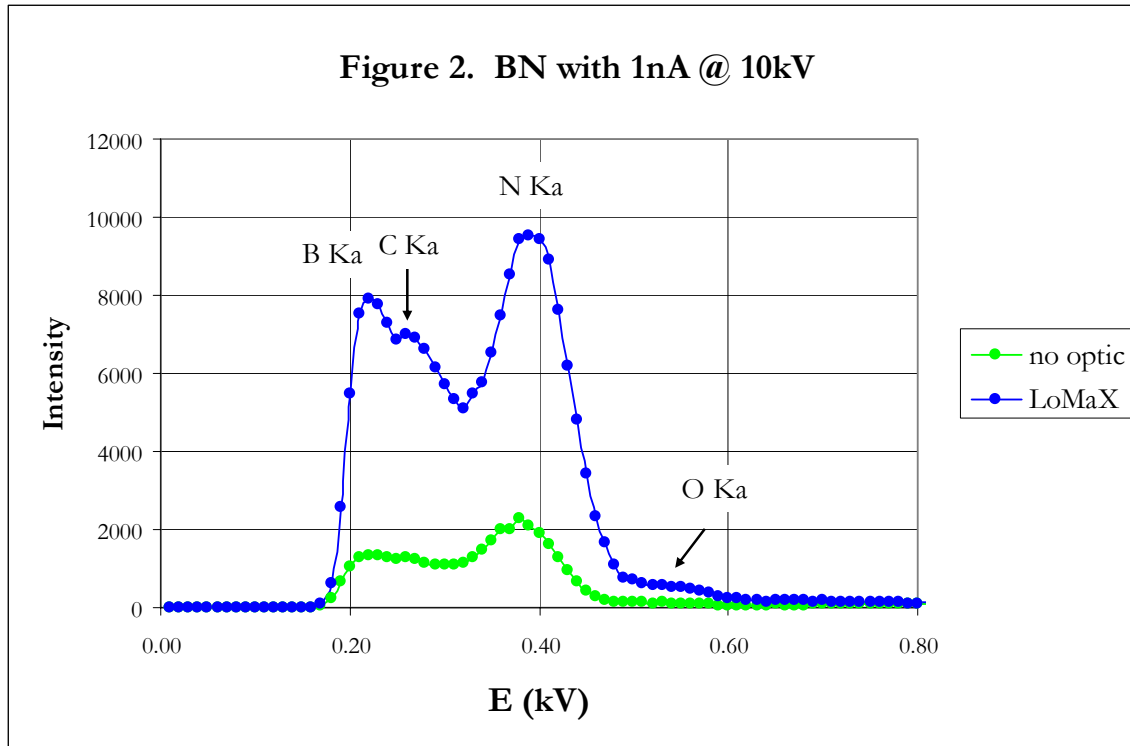


Figure 2 above shows data on BN coated with ~ 20 nm carbon with 1nA at 10kV. The low-energy gain of the LoMaX is immediately evident with a gain of ~ 6 for B K_{α} and C K_{α} , and a gain of ~ 4 for N K_{α} . While the low-energy gain of the LoMaX EDS optic certainly increases the detected gross B, C, N and O K_{α} intensities, the linear energy-dependent gain below 750 eV allows from the resolution of the B K_{α} and C K_{α} peaks. The standard EDS data shows a very broad plateau between 200 and 300 eV while the data taken with the LoMaX shows two clearly resolvable peaks. It should be noted that the energy-dependent low-energy gain is an advantage in this application. A constant gain between 200 and 300 eV would have improved the counting statistics for the B and C K_{α} peaks, but it is the linear gain that has allowed the resolution of B and C using low-energy K lines.