

## NAA Measurements with the LBNL Neutron Facility\*

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Neutron Activation Analysis (NAA) has been limited mainly to nuclear reactor facilities. The high-flux LBNL neutron generator offers the prospect of high quality NAA analysis without the limitations imposed by reactor requirements. Reactor NAA has high analytical sensitivity with long-lived activation products, but is less optimal for producing short-lived activities and induces high levels of radioactivity rendering samples unusable for further study. Neutron generator based activation is well suited for producing short-lived activation products, and samples require only short cooling off periods before becoming available for additional analysis. We have developed a port for neutron activation

analysis, and NAA can be applied at the LBNL neutron facility to analyze  $\approx 50$  elements. Figure 1 shows a test NAA spectrum for the analysis of NaCl measured using the neutron generator operating at a flux of  $\approx 10^9$  n/s corresponding to a fluence of  $\approx 10^5$  ncm<sup>-2</sup>s<sup>-1</sup> at the target position. We plan to apply NAA to legacy waste analysis, archaeology, and photochromic materials studies.

### Footnotes and References

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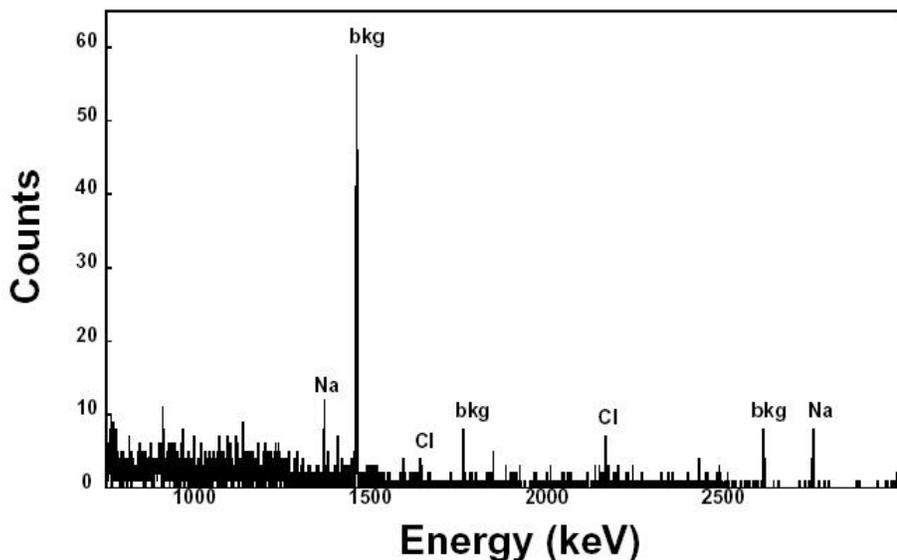


Figure 1. Neutron activation analysis of NaCl at the LBNL neutron generator facility. The sample was irradiated for 10 minutes with a neutron flux estimated at  $10^5$  ncm<sup>-2</sup>s<sup>-1</sup> and counted with a 20% HPGe detector for 15 minutes. The observed activities are <sup>24</sup>Na (14.959 h) and <sup>38</sup>Cl(37.24 m).