

# IMPROVEMENT OF DETECTION LIMITS OF A PORTABLE TXRF BY REDUCING ELECTRICAL NOISE

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In recent years, TXRF analysis is widely applied to various fields such as environmental and biological analysis. This is because sample preparation became easier and the measurement can be done in the ambient air. We developed a portable TXRF spectrometer which consist of low power X-ray tube (50 kV Magnum, Moxtek), X-ray waveguide, and Si-PIN detector (X-123, Amptek). The detection limits of the portable TXRF spectrometer was 10 picogram [1]. We believe that it is possible to decrease the detection limits by reducing the background noise of the spectrometer. For the first step, we modified the portable TXRF spectrometer by shielding cables of the X-ray generator with copper tape and changing the power source of the Si-PIN detector from AC to DC. When 20  $\mu\text{l}$  of a commercially available mineral water containing 650 ppb vanadium was measured at 1.25 W (25 KV and 50  $\mu\text{A}$ ) for 5 minutes, intensities of some peaks increased a little bet and the background in the energy region higher than 15 keV increased by the modification as shown in fig. 1. For the next step, we are planning to fabricate compete electromagnetic shield and change the Si-PIN detector to Si X-ray detector whose background noise is smaller than Si-PIN detector.

[1] S. Kunimura and J. Kawai, *Analyst*, **58**, 1909 (2010).

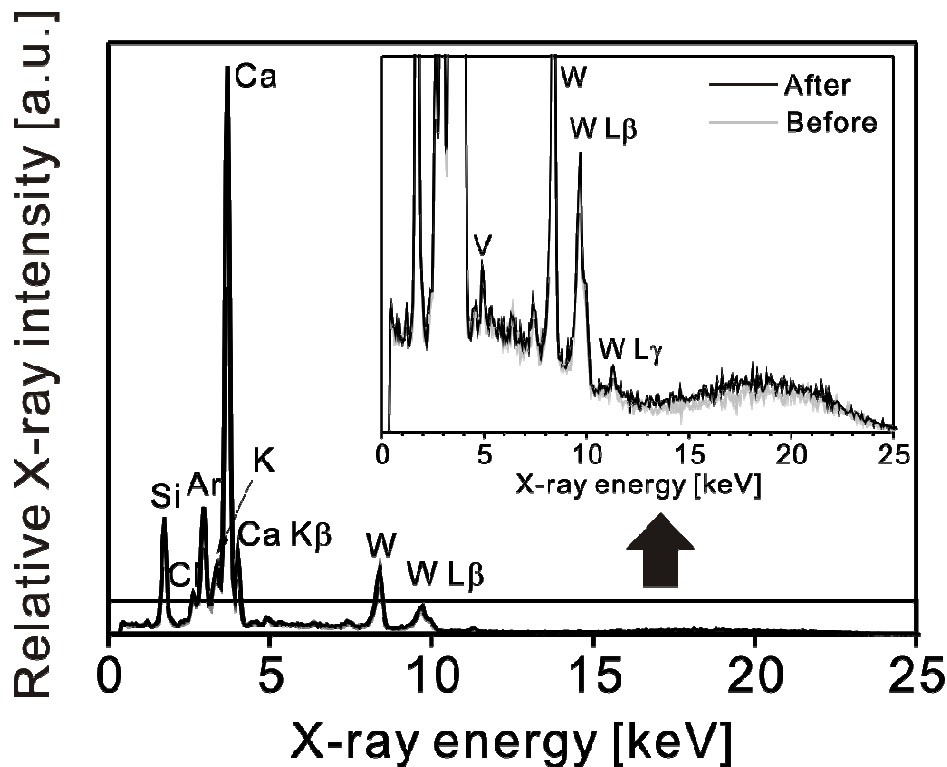


Fig. 1 TXRF spectra of mineral water before and after modification.