

Guide to Configuring XRF Filters and Tube Powers

The XRF spectrometer uses a Rh X-ray source and Pd slits. This means that Rh and Pd lines will always be present in your spectra, unless they are removed. The Rh and Pd L-lines can obscure the presence of elements such as Cl and S.

Filters can be used to remove the Rh and Pd L-lines from your spectra. Combinations of tube power and different filters can also make the instrument more sensitive to certain elements. The recommended power / filter settings for different applications are discussed below

GENERAL ANALYSIS

This setting allows X-rays from 1 to 40 keV to reach the sample. All elements from Mg to Pu will be excited and produce a fluorescence signal. Rh and Pd lines from the source will be present in the spectrum. This will prevent observation of Cl and S lines.

Settings:

- Do not use a filter.
- Set the voltage to 40 kV
- Use the lowest possible current for metallic and the highest possible current for non-metallic samples
- Use the vacuum

ANALYSIS OF LIGHT ELEMENTS (Cu and below, except S and Cl)

This setting allows X-rays from 1 to 15 keV to reach the sample. The elements Mg, Al, Si, and P to Cu will be excited. The Rh and Pd lines will be present, so you will not be able to observe Cl or S lines. Because the Rh L lines are reaching the sample, elements with their absorption edge below 2.3 keV will be strongly excited—this includes Mg, Al, and Si.

Settings:

- Do not use a filter
- Set the voltage to 15 kV
- Set the current to 55 μ A
- Use the vacuum

ANALYSIS OF LIGHT ELEMENTS, (Fe and below, except for Ti and Sc but including S and Cl)

This setting allows X-rays from 3 to 12 keV to reach the sample. The Ti filter absorbs many of the Rh L-lines and fluoresces Ti K-lines. This removes the Rh and Pd lines from the spectrum and will strongly excite an element with their absorption edge below 4.5 keV. However, Ti lines will be present in the spectrum, so this would not be appropriate in measuring for Ti content.

Settings:

- Use the **Blue** filter (which is Ti metal)
- Set the voltage to 15 kV
- Set the current to 55 μ A
- Use the vacuum

ANALYSIS OF METALS (Ti to Ag and W to Bi)

This setting allows X-rays from 12 to 40 keV to reach the sample. There is little sensitivity to elements below Ca.

Settings:

- Use the **Yellow** filter (Ti and Al)
- Set the voltage to 40 kV
- Start with the current at 10 μ A; lower it if the count rate is too high
- Do not use the vacuum

ANALYSIS OF HEAVY METALS (higher Z elements such as Hg, Pb, Br, As)

This setting allows X-rays from 14 to 40 keV to reach the sample. This setting is most sensitive to As and Pb. There is little sensitivity to elements below Ca.

Settings:

- Use the **Red** filter (Ti, Al, and Cu)
- Set the voltage to 40 kV
- Set the current to 15 μ A
- Do not use the vacuum

ANALYSIS OF HIGHER Z ELEMENTS (Fe to Mo) in ceramics

This setting allows X-rays from 17 to 40 keV to reach the sample. This will excite elements from Fe to Mo. This setting is optimized for Rb, Sr, Y, Zr, and Nb. There is little sensitivity to elements below Fe.

Settings:

- Use the **Green** filter (Cu, Ti, Al)
- Set the voltage to 40 kV
- Set the current to 15 μ A
- Do not use the vacuum