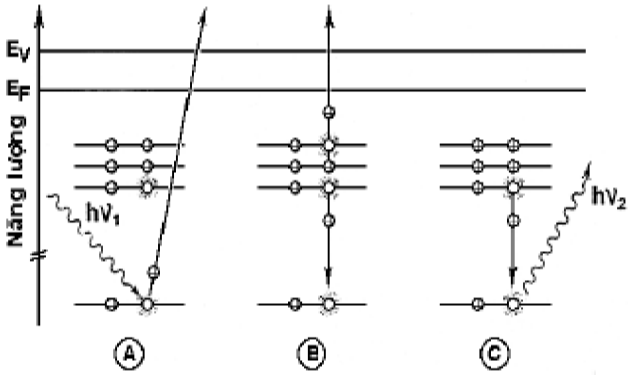
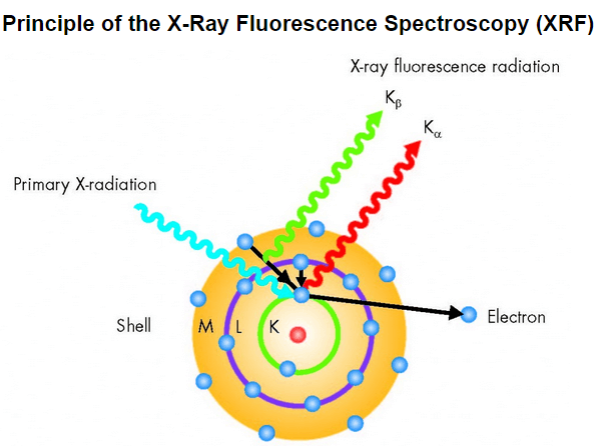
Objective: to determine the elemental composition of materials.

Operating principle: stimulate inner electron(s) for qualitative analysis and quantitative analysis. A primary X-ray, typically generated in an X-ray tube, hits an inner shell electron of the atom and ejects the election from the atom. The open position is filled by an electron from a further outer shell and fluorescence radiation is emitted. XRF analyzers determine the chemistry of a sample by measuring the fluorescent (or secondary) X-ray emitted from a sample when it is excited by a primary X-ray source.



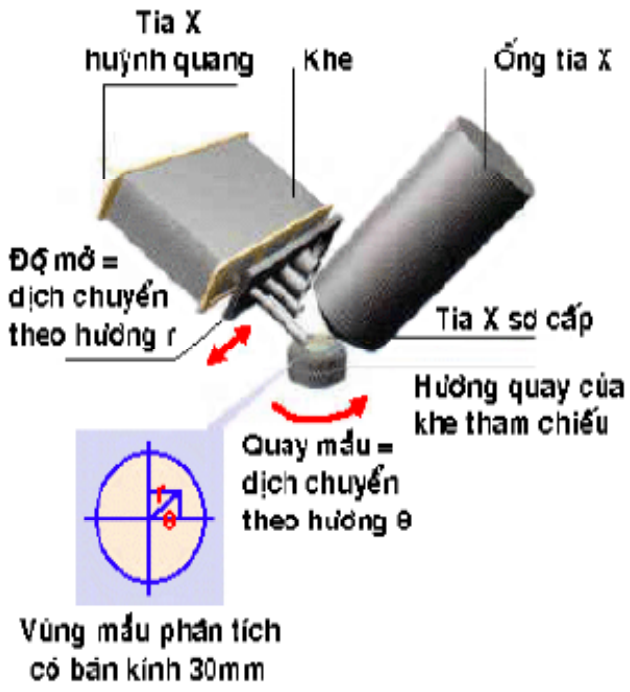


Firstly, X-ray gives energy to electrons of the inner shell making those escape its atoms creating electron emission. Electrons of the outer shell will move to inner holes created by electron emission and this will include secondary X-ray fluorescence (XRF) emission. This wavelength is typically identified its absorbing atom and is also independent of the wavelength of primary X-ray.

Method of analysing primary XRF: requiring sample sitting in anticathode. So, this method is not popular as it is complicated. Also, sample has to bear with vacuum environment while operation actions are complicated and samples are demolished.

Method of analysing secondary XRF: let us do qualitative analysis and quantitative analysis without breaking samples.

The principle is to irradiate primary X-ray to a sample making elements stimulated and emitting typical secondary radiation.



The method of qualitative anasysis is based on typical wavelength of radiation of elements.

The method of quantitative anasysis is based on intensities of typical radiation of elements.