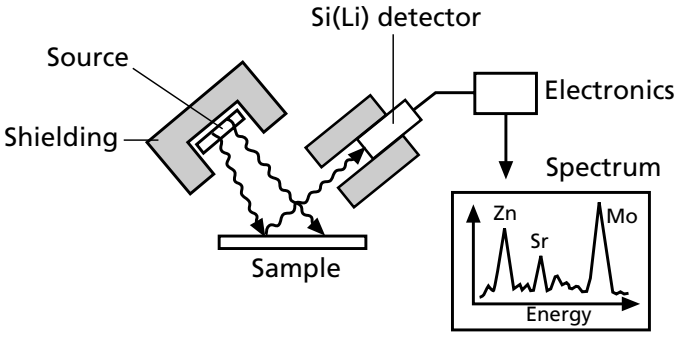
X-Ray fluorescence

Technique

Primary radiation from the radioisotope source excites atoms of the elements present in the sample, removing electrons from the sub-shells around the nucleus. X-rays characteristic of each element are emitted as electrons from the outer shells and move to fill the gaps created in inner shells. The shell from which the electron is removed determines the series of X-rays produced. The intensity of the X-ray is indicative of the concentration of the particular element in the sample. Since radioisotopes emit specific radiations, a limitation results on the range of elements whose characteristic X-ray can be excited. Thus a series of nuclides is employed in order that excitation of all elements from silicon to uranium can be achieved.

Geometry



Applications

- Alloy analysis for checking stock, scrap sorting and checking components
- In mining, analysis of material excavated from pits, and cores, chippings and slurries from drilling operations
- Analysis of electroplating solutions
- General chemical analysis.

Sources

Nuclide	Energy	Typical elemental range of excitation		See page
		K X-rays	L X-rays	
Iron-55	5.9–6.5 KeV (Mn L X-rays)	Silicon-Vanadium	Niobium-Tin	B24
Curium-244	12–23 KeV (Pu L X-rays)	Titanium-Selenium	Cerium-Lead	B21
Cadmium-109	22–26 KeV (Ag K X-rays)	Titanium-Molybdenum	Terbium-Uranium	B8
Americium-241	60 KeV (γ-rays)	Zirconium-Antimony	Tungsten-Uranium	B1

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