§ 7.1.1 Atomic Absorption Summarization

Atomic absorption spectrometry(AAS) is an effective instrumental analysis method for the quick determination of trace

metal ions. The analytical method using atomic absorption is named as AAS method. The analytical method founded
by using atomic emission phenomenon is named as AES method.

The AAS possesses the following characteristics:

1. As molecule, atom can transit from ground state to excited state after it absorbs the specific energy. Thus atomic spectroscopy

(linear spectroscopy) forms, namely resonance absorption line (for short resonance line).

2. The transition from ground state to first excited state is the easiest to produce.

3. Electron distributing of each kind atomic is different. Atom absorbs radiant energy of certain frequency when it produces transition

from ground state to first excited state. It possesses characteristic, characteristic frequency and resonance absorption line (for short resonance line).

4. Atomic spectroscopy is different from molecule spectroscopy. In theory, the shape of atomic absorption peak is of line.

5. The overlap of the absorption lines of different elements is almost negligible.

6. Metal ion compounds can dissociate into atomic vapor. These two forms possess certain quantitative relationship.When certain

wavelength light coming from source passes atomic vapor, outer layer electron of atom absorbs energy. The intensity of characteristic line is weaken, and the variety fulfils Lambert-beer's law. Atomic absorption is quantified according to this law.

7.Atomic absorption phenomenon is known in the early last century, but it can't be used as practical analysis of element. The problem is thatwhen the light of consecutive wavelength irradiates mixed atomic vapor, the two closely spectral line can't be divided by instrument.

For example:

For a spectral line of 550nm, the resolution need to be $500/10^{-3} = 5\times10^{5}$ nm when the two wavelength difference present the

is10^{-3} nm. At atomic absorption spectrometer is not to come true.

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A special instrument was introduced successfully in 1955 by A.walsh. He succeeded in establishing atomic absorption

method,and published classical thesis "the application of atomic absorption spectrometry in the analytical chemistry"。

Outline of this page: What's the essential characteristics of AAS?

Thinking subject of this page: Who first founded AAS method?

Thinking subject of next page: Atomic absorption phenomenon is early known, why this method was founded until 1955?