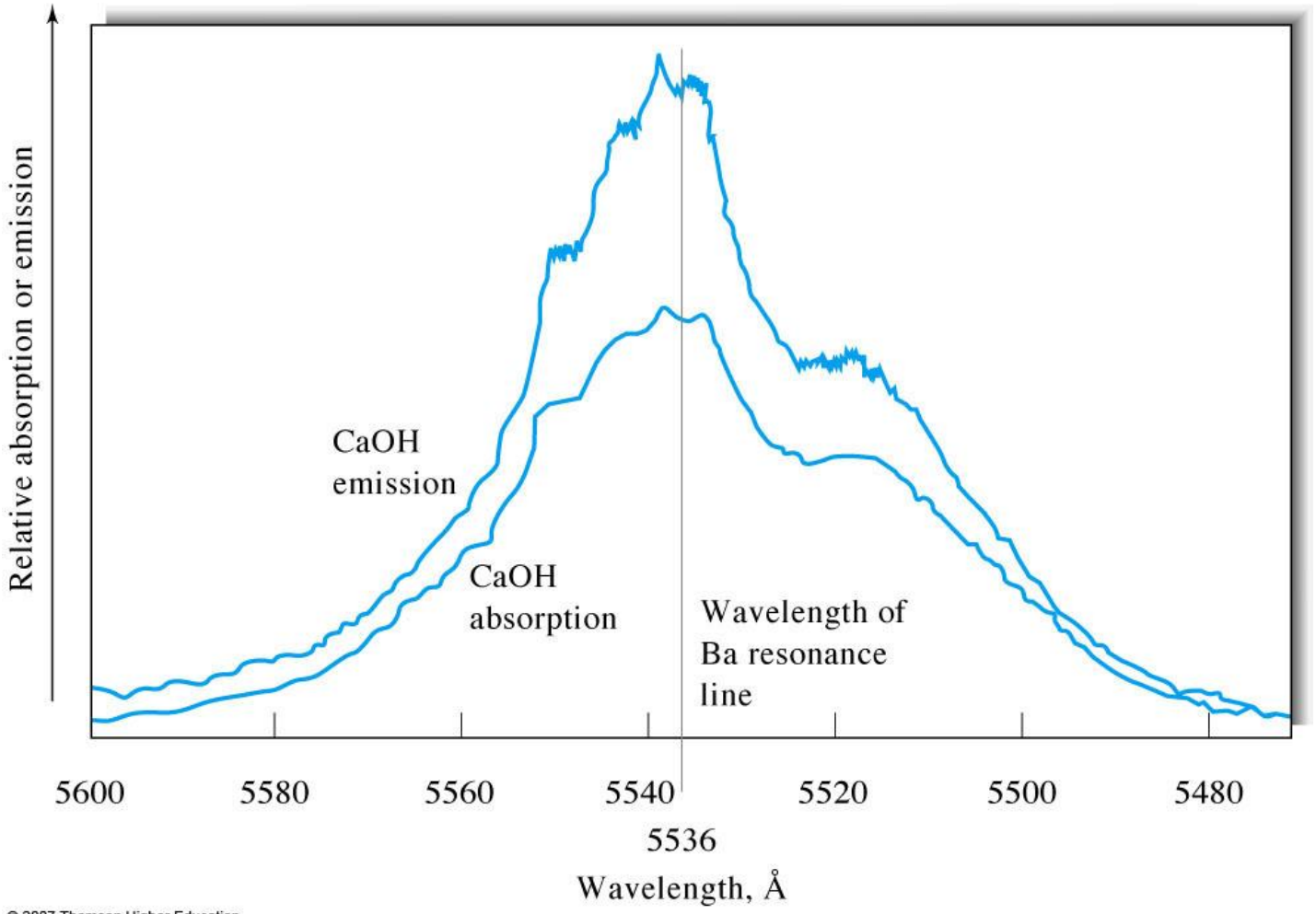

…Spectral Interferences continued…

(IV) Large particle size refractory oxides.

Concentrated solution of elements such as Ti, Zr and W which form refractory oxides can cause spectral interference due to scattering.

(V) Scattering due to organic solvent or organic impurities;

in the sample can cause scattering interference from carbonaceous particle because of incomplete combustion of the organic matrix.

✓Fortunately, with flame atomization, spectral interferences by matrix products are not widely encountered and often can be avoided by variations in the analytical variables, such as *flame temperature and fuel-to-oxidant ratio*.
✓Alternatively, if the source of interference is known, an excess of the interfering substance can be added to both sample and standards. Provided the excess added to the standard sample is large with respect to the concentration from the sample matrix, the contribution from the sample matrix will become insignificant. The added substance is sometimes called a *radiation buffer. The method of* standard additions can also be used advantageously in some cases.

Several methods have been developed for correcting for spectral interferences caused by matrix products.

Methods for correcting spectral interferences

1. The Two-Line Correction Method:

- The two-line correction procedure uses a line from the source as a *reference*, This line should *lie as close as possible to the analyte line* but *must not be absorbed by the analyte*.
- If these conditions are met, it is assumed that any decrease in power of the reference line from that observed during calibration arises from absorption or scattering by the matrix products of the sample.
- This decrease in power is then used to correct the absorbance of the analyte line,
- the reference line may be from an impurity in the hollow cathode, a neon or argon line from the gas contained in the lamp, or a nonresonant emission line of the element that is being determined,
- Unfortunatelv, a suitable reference line is often not available,

2. Continuum-Source Correction Method:

✓ In this technique, a deuterium lamp provides a source of continuum radiation throughout the ultraviolet region.

✓ Radiation from the continuum source and the hollow-cathode lamp are passed alternately through the electrothermal atomizer.

✓ The absorbance of the deuterium radiation is then subtracted from that of the analyte beam.

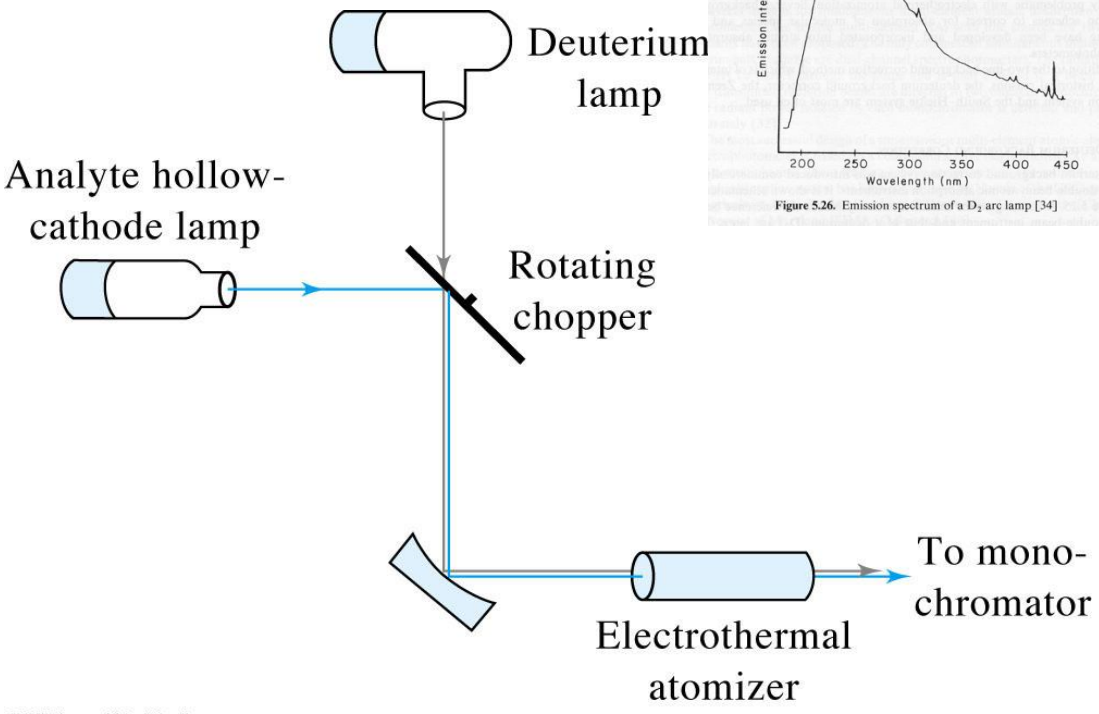

Figure 5.26. Emission spectrum of a D_2 arc lamp [34]

Unfortunately, the performance of this method is often less than ideal, which leads to undercorrection in some systems and overcorrection in others.

✓ if the two lamps are not in perfect alignment,

✓ the radiant output of the deuterium lamp in the visible region is low enough to preclude the use of this correction procedure for wavelengths longer than 350 nm,