

Chapter 1

Conventional NIR spectroscopy

*** Intro : Sen utveckling. Var det brjade. "Sleeper"

Although the near-infrared (NIR) region was discovered already in 1800, as the first region outside the visible wavelength range, it was seen as a sleeper amongst spectroscopic techniques for many ears. Several absorption bands in the NIR region were assigned to different functional groups already in the first half of the 20th century, but the number of applications were low until the 1950ies when several groups started to do instruments and applications. This chapter will focus on instrumentation and applications for measurements on solid samples in general and pharmaceutical samples in particular.

1.1 Instrumentation

All spectroscopic systems have the same basic components, see fig. 1.1. The distinguishable parts are the light source, the wavelength selection devise, the sample interface optics and the detector. The wavelength selection devise may be placed in front or after the sample.

1.1.1 Light source

In most commercial systems a tungsten halogen lamp is used as light source. The lamp has a continuous spectrum in the entire NIR range and has the benefit of being cheap and robust. One of the drawbacks with tungsten halogen lamps is that their emission is temperature dependent. The drift is typically 0.5 milliabsorbance units per degree Kelvin in the NIR range¹, which can be minimized by using temperature stabilisation. A typical

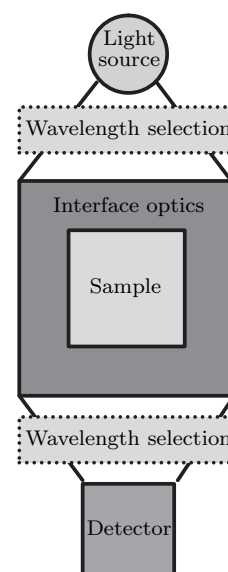


Figure 1.1. Basic components of a spectroscopic system

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