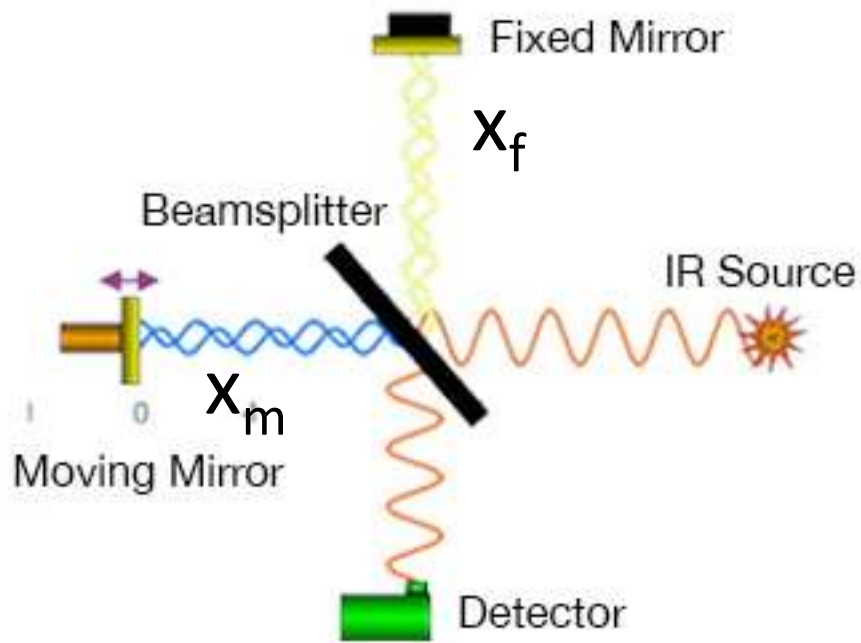


Espectroscopía infrarroja de transformada de Fourier



$$I(\delta, \lambda) = B(\lambda) \cos^2 \left(\frac{\pi \delta}{\lambda} \right)$$

$$\delta = x_f - x_m$$

CONDICION PARA UN MAXIM

$$\delta = m\lambda$$

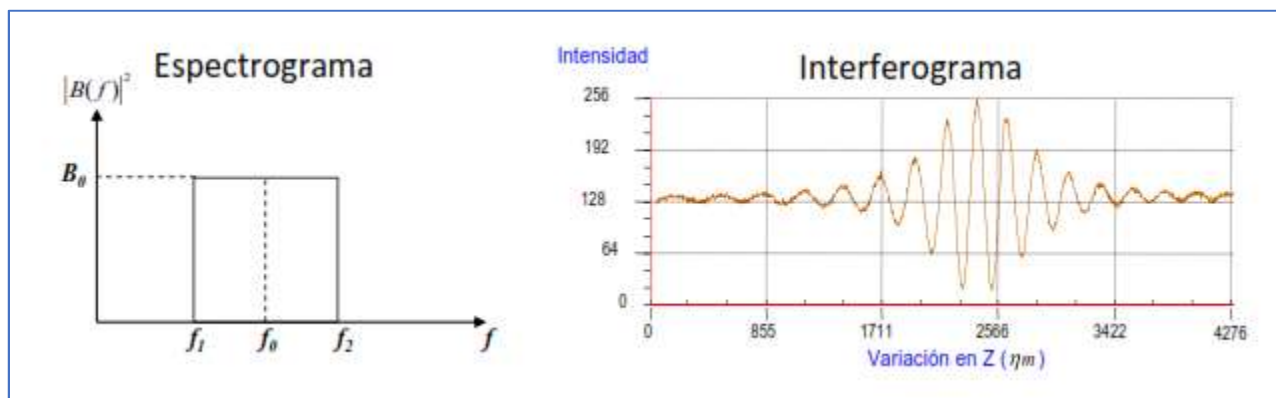
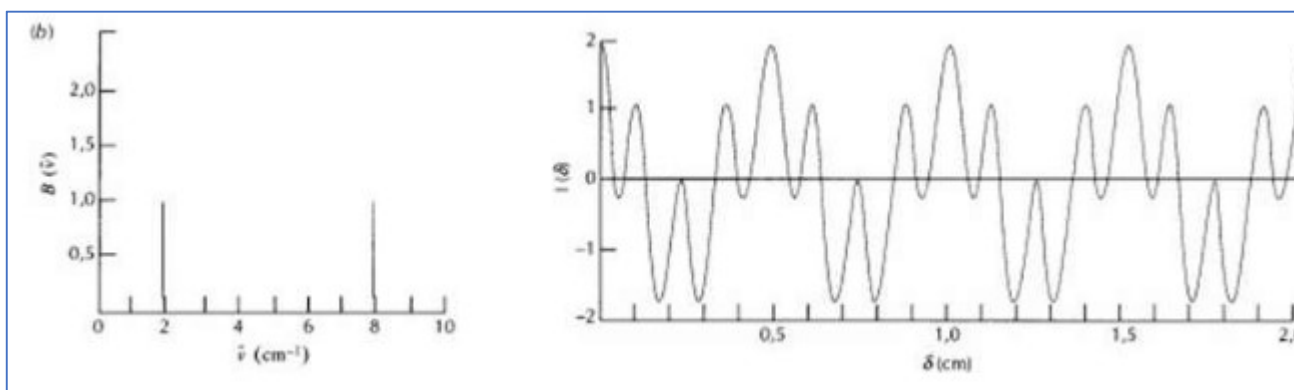
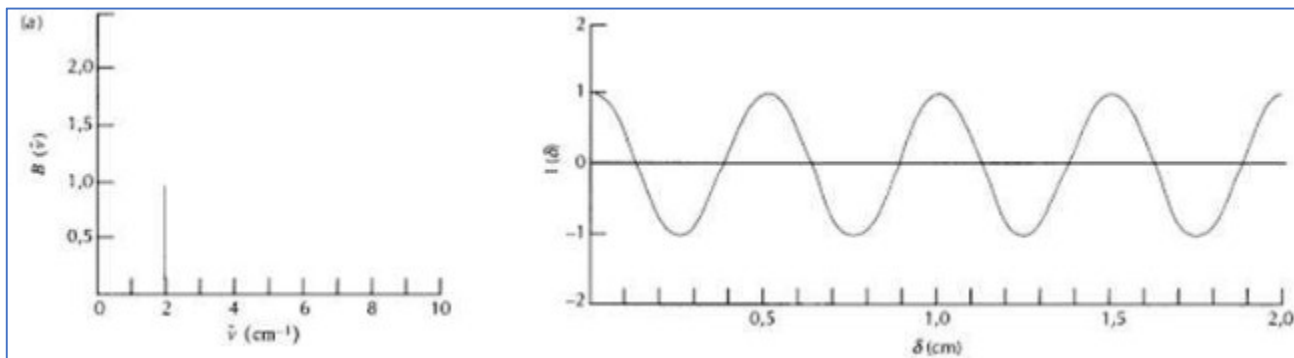
CONDICION PARA UN MINIMO

$$\delta = \left(m + \frac{1}{2} \right) \lambda$$

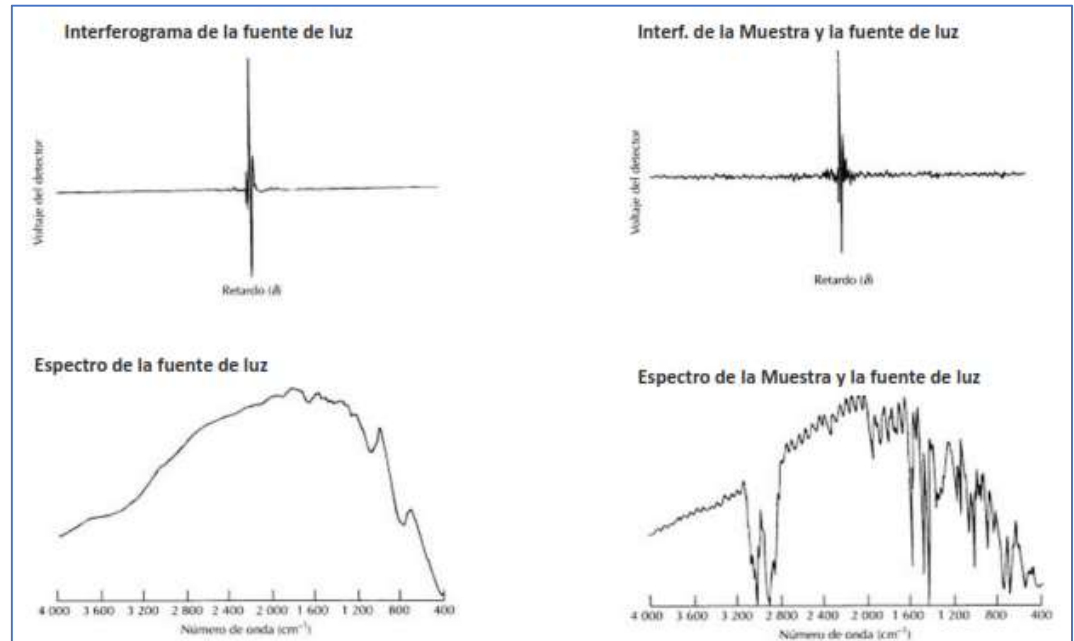
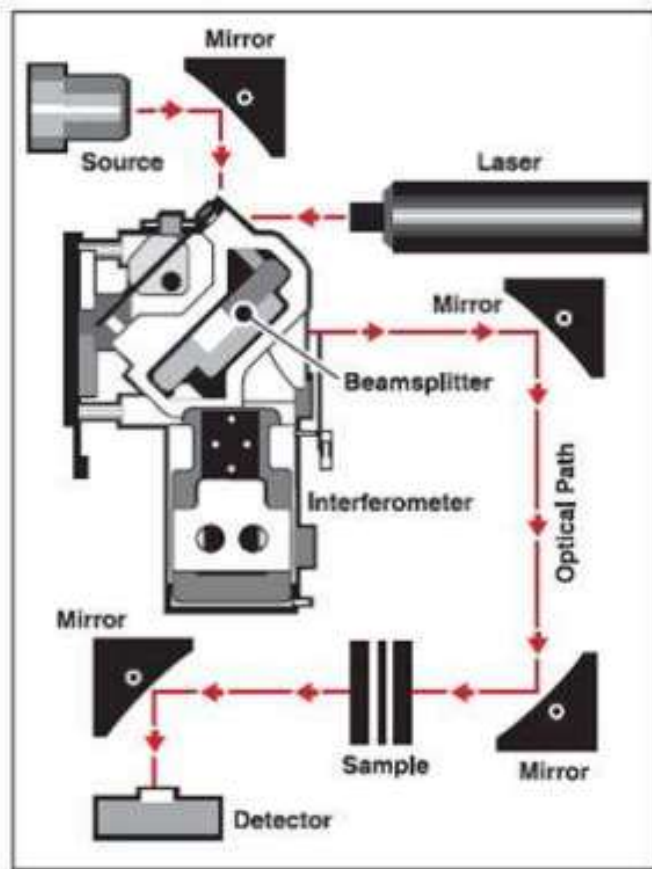
$$I(\delta, \lambda) = \frac{B(\lambda)}{2} \left(1 + \cos \left(\frac{2\pi \delta}{\lambda} \right) \right)$$

$$I(\delta) = \int_0^{\infty} B(\lambda) \cos \left(\frac{2\pi \delta}{\lambda} \right) d\lambda$$

$$B(\lambda) = \int_{-\infty}^{\infty} I(\delta) \cos \left(\frac{2\pi \delta}{\lambda} \right) d\delta$$



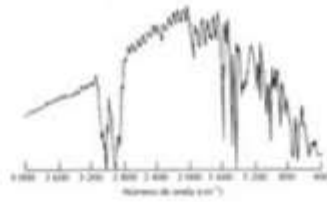
Configuración típica de un espectrómetro FTIR



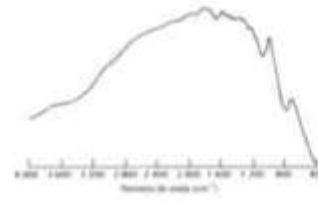
Ley de Lambert-Beer

$$I = I_0 10^{-A}, \quad A = cl\varepsilon(\lambda), \quad A = \log \left(\frac{I_0}{I} \right)$$

Espectro de la fuente de luz y la muestra



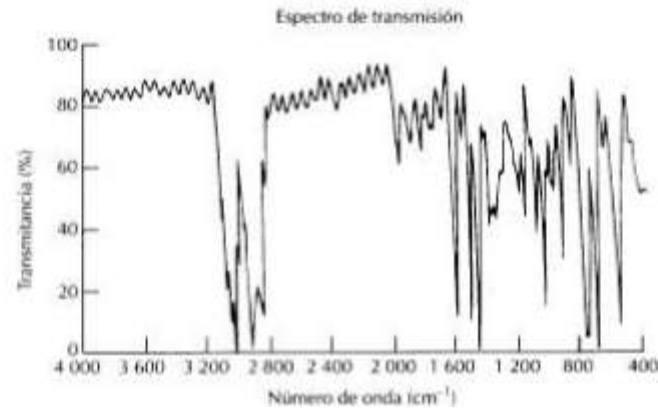
Espectro de la fuente de luz



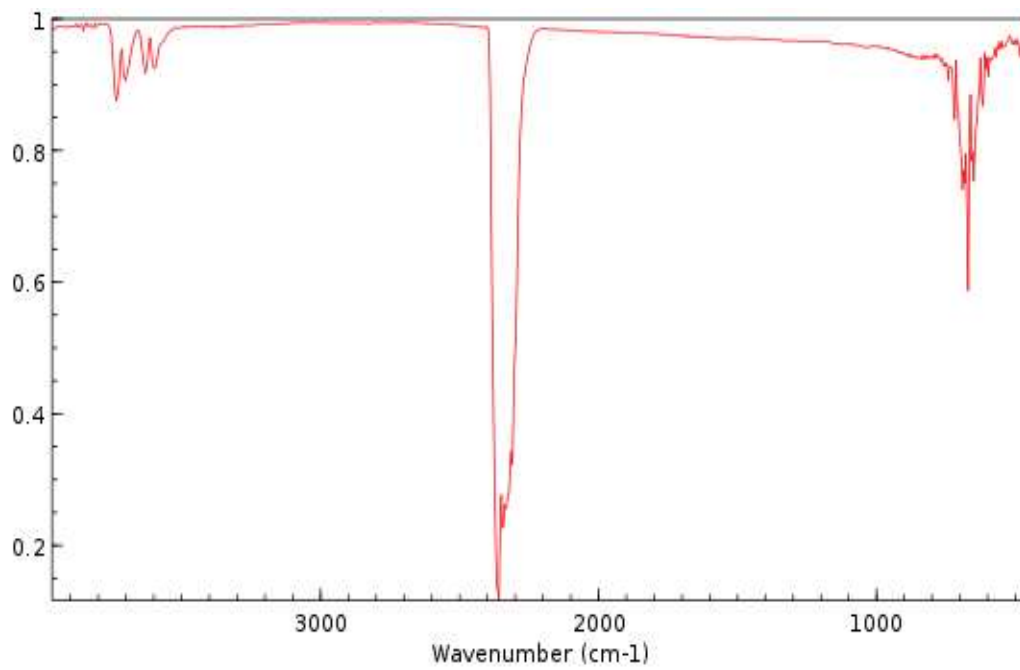
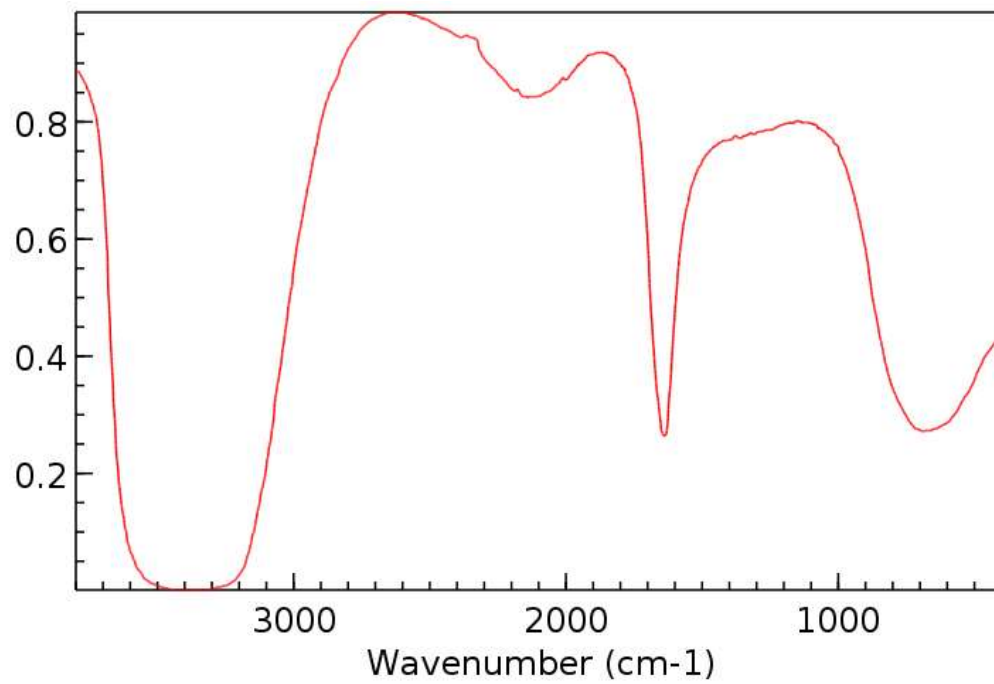
÷

x100 =

Espectro de Transmisión de la muestra



$$T = 100 \frac{I}{I_0}$$



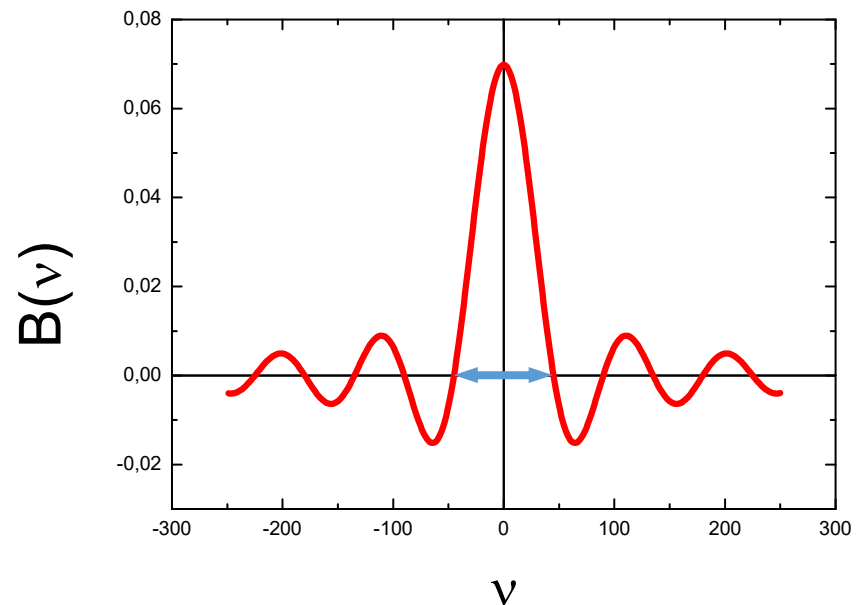
Resolución espectral de un FTIR

$$B(\lambda) = \int_{-\delta_m}^{\delta_m} I(\delta) \cos\left(\frac{2\pi\delta}{\lambda}\right) d\delta$$

$$\text{si: } I(\delta) = 1 \text{ y } \nu = 1/\lambda$$

$$B(\nu) = \frac{\sin(2\pi\nu\delta_m)}{\pi\nu}$$

$$\Delta\nu = \frac{1}{\delta_m}$$



Apodización del interferograma

Apodization Function ($ x \leq L$)	Fourier Transform Image	FWHM	Resolution	Ripple	
Box-car	1	$2L \frac{\sin 2\pi\nu L}{2\pi\nu L}$	0.60/L	0.68/L	-0.215
Triangular	$1 - \frac{ x }{L}$	$L \left(\frac{\sin \pi\nu L}{\pi\nu L} \right)^2$	0.88/L	0.88/L	+0.045
Happ-Genzel	$0.54 + 0.46 \cos\left(\frac{\pi x}{L}\right)$	$\left\{ \frac{0.54}{\pi\nu} + \frac{0.46 \times 4\pi\nu L^2}{\pi^2 - (2\pi\nu L)^2} \right\} \sin(2\pi\nu L)$	0.91/L	0.89/L	-0.006
Cosine (Cos)	$\cos\left(\frac{\pi x}{2L}\right)$	$\frac{\pi L}{(\pi/2)^2 - (2\pi\nu L)^2} \cos(2\pi\nu L)$	0.82/L	0.85/L	-0.067
Lorenz	$\exp\left(-\frac{ x }{L}\right)$	$\frac{2L}{1 + (2\pi\nu L)^2} \times [e^{-1} \{2\pi\nu L \sin(2\pi\nu L) - \cos(2\pi\nu L)\}]$	0.71/L	0.73/L	-0.055
Gaussian	$\exp\left\{-\left(\frac{2.24x}{L}\right)^2\right\}$	$\frac{L\sqrt{\pi}}{2.24} \exp\left\{-\left(\frac{\pi\nu L}{2.24}\right)^2\right\}$	1.17/L	1.16/L	-0.000

