

Keywords:

Chiral detection

Optical Rotation Dispersion

## Chiral detection - a question of the wavelength ?

by : W. Zelenka (Ibz Messtechnik GmbH) , P. Rozea (Synergetic Associates Inc.), J. MacFarlane (Jm Science Inc.)

The dependence of the rotational strength optical active molecules on the wavelength is described by the *Optical Rotation Dispersion (ORD)*. It is specific to the chiral molecule and differs in intensity, but in general, shows higher rotational strength for shorter wavelength in the so called *plain curve*. It is connected with *Drude's equation* and describes the normal behaviour of the ORD in absence of chromophores or far away from absorption band [1]

$$\text{Drude's equation : } [\alpha]_{\lambda} = \sum A_i / (\lambda^2 - \lambda_i^2)$$

( $A_i$  constant molecular characteristic)

( $\lambda_i$  constant wavelength)

Within or nearby strong absorption band, the ORD curve may become abnormal and will not obey Drude's equation anymore, showing Cotton effects and may even change sign of rotation. Due to this, the light spectra for chiral detection is restricted by strong absorption and Cotton effects for short wavelength in spite of high optical rotation. Going to longer wavelength (IR), the optical rotation becomes extremely weak and therefore gets unfit for chiral detection .

The *CHIRALYSER* [2,3] (IBZ MESSTECHNIK GMBH, Germany), chiral detector for monitoring optical active molecules in analytical and preparative HPLC, operates at 430 nm to profit by high optical rotation for short wavelength without getting in conflict with absorption phenomena. The light source is a high power blue LED (light emitting diode) which, in contrary to a laser, will not show the opto-physical disadvantages in chiral detection.

Fig. 1 : Typical ORD curve

Fig. 2 : (1R)-(-) Camphorquinone at different wavelength

Meet the author:

info@ibzmesstechnik.de ///www.ibzmesstechnik.de

PRozea@aol.com

jmscience@compuserve.com/// www.jmscience.com

References:

[1] G. Snatzke, Angew.Chemie, 80, 15ff (1968)

[2] W. Zelenka, A. Leiminer, A. Manschreck,  
GIT Fachz.Lab.37 (1993); Chem.Abstr.118 (1993) 182 432

[3] IBZ (unpublished results)

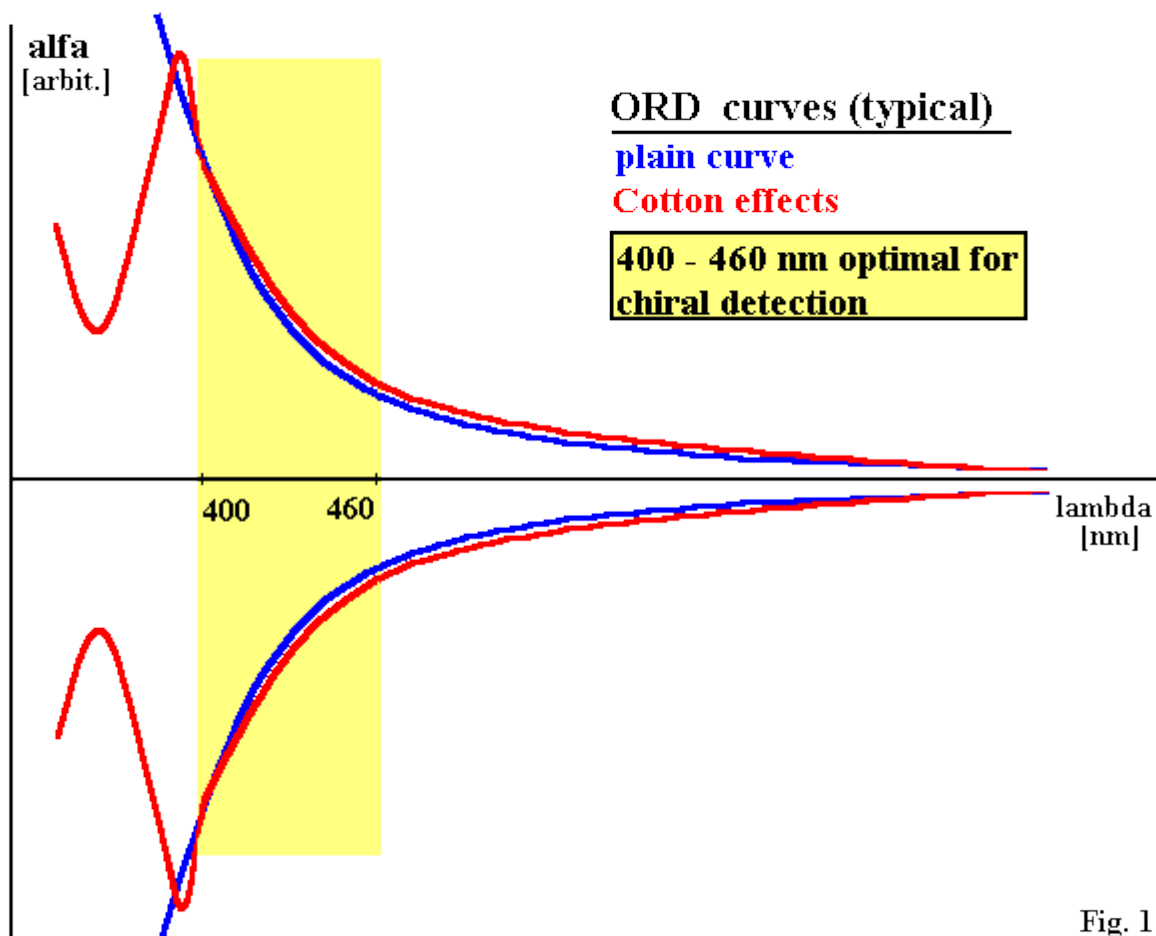


Fig. 1

