

MEASURING CD & LD SIMULTANEOUSLY

In previous TR 37 we discussed of potential artifacts coming from linear dichroism. A good practice running critical samples is therefore to collect LD at same time. This is easy, particularly with more modern instruments that allow to detect more signals simultaneously.

We fitted on a J-810 a standard LD-403 option and we wired LD lock-in output, via an attenuating potentiometer, to one of the external signal inlets. In this way we could easily detect CD & LD simultaneously despite the PEM program used is the CD one; scale calibration can be easily performed using a quartz plate¹.

To test the system we used a PVA film dyed with Congo red as suggested by Shindo², who kindly provided also the sample, as a good example of strong apparent CD spectra coming only from artifacts.

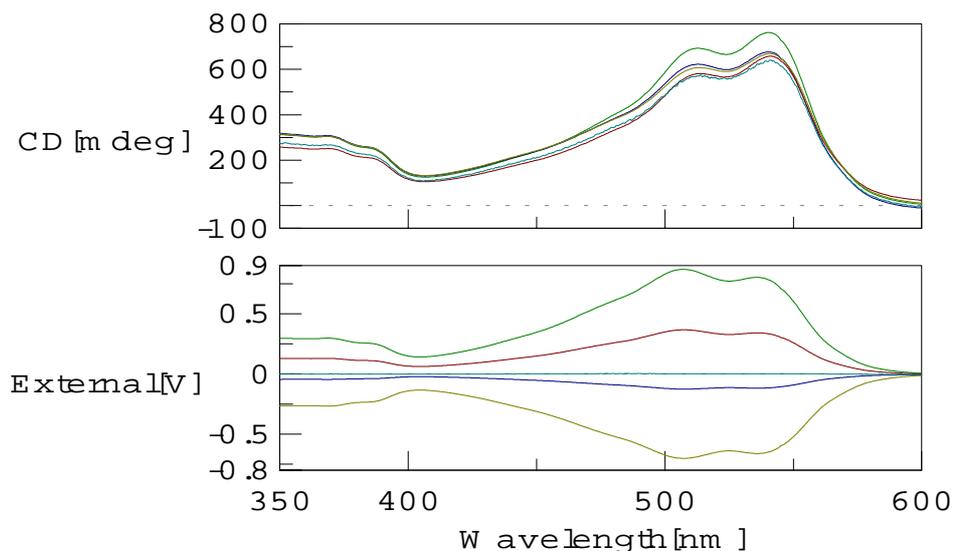
Figure below shows the recorded CD and LD spectra.

5 spectra were collected rotating the sample around the beam axis. One angular position was selected to give nearly no LD spectra.

The apparent CD signal is very insensitive to rotation, while the LD one is strictly correlated to the above.

We apply equation 1 reported in TR 37:

$$CD_r = G_0 [CD + 1/2 (LD'LB - LDLB') + (LD' \sin 2\theta - LD \cos 2\theta) \sin \alpha]$$



In this case CD is zero since sample is NOT optically active:

- the small variation of the apparent CD spectra are due to contribution of second term of the equation
- the first term is responsible of the average CD spectra.

Since we cannot eliminate LD and LB interference in the CD spectra it's clear that possibility to detect at same time the LD spectra will provide a substantial help in sorting out the meaning of the whole experiment.

Simultaneous LD detection is therefore a very recommendable practice dealing with potentially oriented samples.

¹ Norden B. & Seth S. *Appl.Spectrosc.* 39 (1985) 647

² Shindo Y. & Nishio M. *Biopolymers* 30 (1990) 25