



OCD, ORIENTED CIRCULAR DICHROISM

OCD is a relatively new technique.

Presented originally in 1988¹ and 1990², the technique has potential in the study of peptide organization within membranes.

The original sampling approaches (somehow simplified in the 1990 paper) were however rather complex and requiring dedicated home-built accessories. Since sampling was performed with incident light at oblique angle to the aligned samples a huge amount of linear dichroism and birefringence was generated. The authors were fully aware of the problem and proposed a way of correction that not everybody would fully accept.

But the group of Prof Huang further progressed in their research and several papers^{3 4 5 6 7} appeared in the following years using not only OCD, but also neutron scattering and X-ray diffraction, getting very consistent results. From Prof Huang web:

*All biological membranes have a common general structure:
each a lipid bilayer with protein molecules embedded in it.
Our work is mainly concerned with the interactions between
proteins and the lipid bilayer
Our goals are the structural and energetic descriptions of how
the peptides behave in a lipid bilayer. Such seemingly simple
problems are complicated by the fact that a lipid bilayer in its
physiological condition is a freely undulating two-dimensional
fluid film. This makes membrane problems uniquely different
from either solution or solid-state problems.*

In the recent papers only normal incidence OCD is typically measured, so all previous concerns about LD and LB interferences are minimized. The preparation of a one-substrate sample on a quartz plate is reported to be not so difficult⁸.

Often the quartz plate is kept in a closed environment to allow hydration at a controlled level, this can be achieved with a relatively simple accessory.

In any case we would recommend to carry on these measurements on an instrument equipped with LD accessory in order to prevent referees objections.

While it's peculiar to see that so far no other groups were involved in this sort of challenging approach, for any further information you may visit Prof Huang web site:

www.ruf.rice.edu/~hwhuang

where from you can download many more details.

¹ Olah G.A., Huang H.W., *J. Chem. Phys.*, 89, 1988, 2531

² Wu Y., Huang H.W., Olah G.A., *Biophys. J.*, 57, 1990, 797

³ Huang H.W., *Biochemistry*, 39, 2000, 8347

⁴ Yang L., Harroun T.A., Weiss T.M., Ding L., Huang H.W., *Biophys. J.*, 81, 2001, 1475

⁵ Ludtke S.J., He K., Wu Y., Huang H.W., *Biochim. Biophys. Acta.*, 1190, 1994, 181

⁶ Heller W.T., Waring A.J., Lehrer R.I., Huang H.W., *Biochemistry*, 37, 1998, 17331

⁷ Chen F.Y., Lee M.T., Huang H.W., *Biophys. J.*, 82, 2002, 908

⁸ Yang L., Weiss T.M., Lehrer R.I., Huang H.W., *Biophys. J.*, 79, 2000, 2002