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linear dichroism (LD)

For a uniaxial sample with sample axis Z is defined as:

$$\Delta A_{\mathrm{l}} = A_Z - A_Y$$

where A_Z and A_Y are the absorption spectra measured with the electric vector of linearly polarized light along and perpendicular to the sample axis, respectively. For an isotropic sample $\Delta A_{\mathrm{l}} = 0$.

Notes:

1. Sometimes the reduced dichroism is used instead. It is defined as

   $$\Delta A_{\mathrm{r}} = \frac{A_Z - A_Y}{A_Z + 2\,A_Y} = \frac{A_Z - A_Y}{3\,A_{\mathrm{iso}}}$$

   with A_{iso} the isotropic absorbance. Thus, ΔA_{r} is analogous to emission anisotropy and the denominator in the equation corresponds to three times the absorbance measured in a similar but isotropic sample.
2. The dichroic ratio $d(\lambda)$ is also a frequently used function of the wavelength. It is defined as

   $$d(\lambda) = \frac{A_Z}{A_Y}$$
3. Most naturally-occurring solid samples exhibit linear dichroism. It may also be produced in the laboratory by dissolving the sample molecules in anisotropic solvents such as nematic liquid crystals or stretched polymers. This procedure tends to produce uniaxial samples. Also crystals may be used as aligned solvents and if the sample forms suitable crystals by itself these may be used directly. Other molecular alignment techniques include application of electric or magnetic fields.
4. Photoselection is a commonly used technique for the production of aligned samples; both the photoselected subset and the set of remaining molecules may be studied.

Source:

PAC, 2007, *79*, 293 *(Glossary of terms used in photochemistry, 3rd edition (IUPAC Recommendations 2006))* on page 365

