

Influence of background colour on the chirality of anaglyph (red/green) stereo diagrams

Robert C Glen

Department of Physical Chemistry, The Wellcome Foundation, Langley Court, Beckenham, Kent BR3 3BS, UK

Anaglyph (red/green) stereo diagrams are a convenient and often used method for displaying the 3D aspects of molecules. However, the chirality of the display may be inverted by a change in background colour and this should be recognized when displaying molecules with stereochemical centres by this method.

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Red-green stereo diagrams¹ are a simple and often used method for displaying molecular structures in two dimensions to give the illusion of three. The method consists of displaying two diagrams, overlaid, one of the pair being rotated about the vertical axis by approximately 6°, thus representing the left and right eye images. One image is presented in red, the other in green or cyan, and similarly coloured filters, one over each eye, ensure that each eye sees only its appropriate image. The unwanted image assumes the colour of the background and is therefore invisible.

The background is generally black (e.g. CRT) or white, such as paper. It is not generally recognized that these two forms of background reverse the chirality of the image. This is obviously of critical importance in the display of chiral molecules.

The reasons for the reversal of chirality are evident from the subtractive nature of the filtering process. A line of either red or green remains unchanged when viewed through a filter of the same colour but appears

black through the complementary filter. Thus, with a black background, a line remains visible only when the filter is the same colour as the line.

A white background, however, assumes the colour of the filter through which it is seen, and an unchanged line of that colour effectively disappears, while appearing black and visible through the complementary filter. A summary of the effects of background on line visibility are given in Table 1. It follows, therefore, that different chiral images are presented to the eye when transferring an image from a CRT with a black background to a plot on white paper. The filters, or preferably the drawn lines, must be interchanged to maintain the correct mirror images.

Table 1. Results of different combinations of line and filter colour

Background	Image	Filter	Result
White	Red	Red	Invisible
White	Red	Green	Visible
White	Green	Red	Visible
White	Green	Green	Invisible
Black	Red	Red	Visible
Black	Red	Green	Invisible
Black	Green	Red	Invisible
Black	Green	Green	Visible

REFERENCE

- 1 Jackson, P H 'Display of red/green stereo images using a raster colour image display' *J. Mol. Graph.* Vol 1 No 1 (March 1983) pp 24-25