optical purity of a mixture of enantiomers = \frac{[\alpha]_{\text{mixture}}}{[\alpha]_{\text{major enantiomer when pure}}} \times 100

[\alpha]_{\text{mixture}} = \text{specific rotation of the mixture}
[\alpha]_{\text{major enantiomer when pure}} = \text{specific rotation of the major enantiomer when pure}

\text{eg:}

Hypothetical compounds (+)-A and (-)-A are enantiomers.

<table>
<thead>
<tr>
<th>enantiomer</th>
<th>[\alpha]_{\text{in water}}</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+)-A</td>
<td>+45</td>
</tr>
<tr>
<td>(-)-A</td>
<td>-45</td>
</tr>
</tbody>
</table>

Consider a mixture of (+)-A and (-)-A whose [\alpha]_{\text{in water}} is -35. The fact that the specific rotation of the mixture is negative means that the major enantiomer of the mixture is (-)-A.

\text{optical purity of the mixture = } \frac{-35}{-25} \times 100
= 77.37 \%

Optical purity of a mixture of enantiomers is numerically equal to its enantiomeric excess.

Contributors

- Gamini Gunawardena from the OChemPal site (Utah Valley University)