If more than one reaction could occur between a set of reactants under the same conditions giving products that are stereoisomers and if one product forms in greater amounts than the others, the overall reaction is said to be stereoselective.

Suppose two reactions could occur between the hypothetical reactants \( A \) and \( B \) under the same conditions giving the stereoisomeric products \( C \) and \( D \).

There are two possibilities:

1. The two products form in equal amounts, i.e., the relative yield of each product is 50%.

   \[
   \begin{array}{c}
   A + B \rightarrow C & \text{relative yield} & 50% \\
   & & \\
   A + B \rightarrow D & & 50% \\
   \end{array}
   \]

   The overall reaction between \( A \) and \( B \) is not stereoselective.

2. One product forms in greater amounts than the other. Say, for example, the relative yields of \( C \) and \( D \) are 75% and 25%, respectively.
The overall reaction between A and B is stereoselective.

Experimentally, 2 is the major product. Thus, the overall reaction between 1 and H₂ is stereoselective toward 2.

The term "stereospecific" is sometimes used to mean "100% stereoselective" (cf. regiospecific). However, the original definition of the term stereospecific is different, so it is best to avoid using the term stereospecific to mean 100% stereoselective.

See also chemoselective, regioselective, diastereoselective, enantioselective

Contributors

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