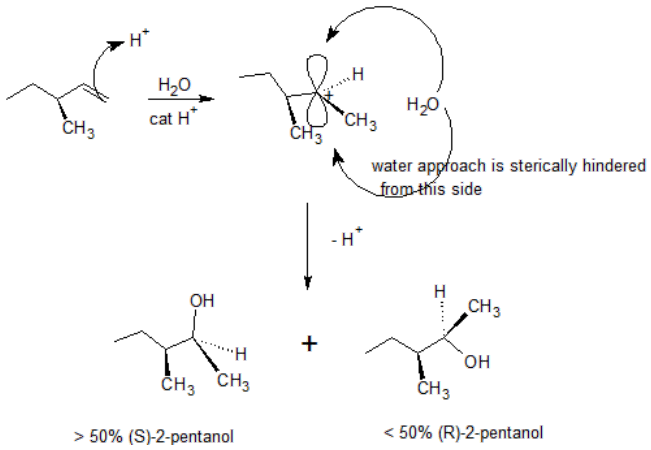
9.8: STEREOCHEMISTRY OF REACTIONS - HYDRATION OF CHIRAL ALKENES

Learning Objective

- discern the stereochemical differences between the EAR of chiral and achiral alkenes

STEREOCHEMISTRY - THE SUBTLE DETAILS

In the previous section, the addition of water to the achiral alkene produced a racemic mixture of two enantiomeric alcohols. They are produced in equal amounts so the mixture is optically inactive. What would occur if we carried out a similar reaction on a chiral alkene? Consider (S)-3-methyl-1-pentene reacting with water (acid catalyzed). Proton addition produces a carbocation intermediate that is chiral (* denotes stereogenic centre). That intermediate does not have a plane of symmetry and therefore attack by water is not equal from the top and bottom. This ultimately produces R and S products in a non 50:50 ratio as shown in the mechanism below.



Exercise

1. Predict the products of the following reaction showing stereochemistry.

Answer

1. The products are diastereomers of one another.

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