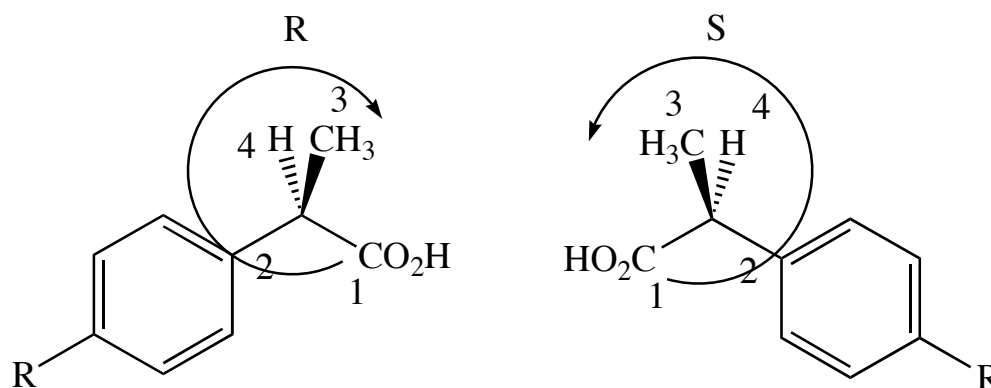


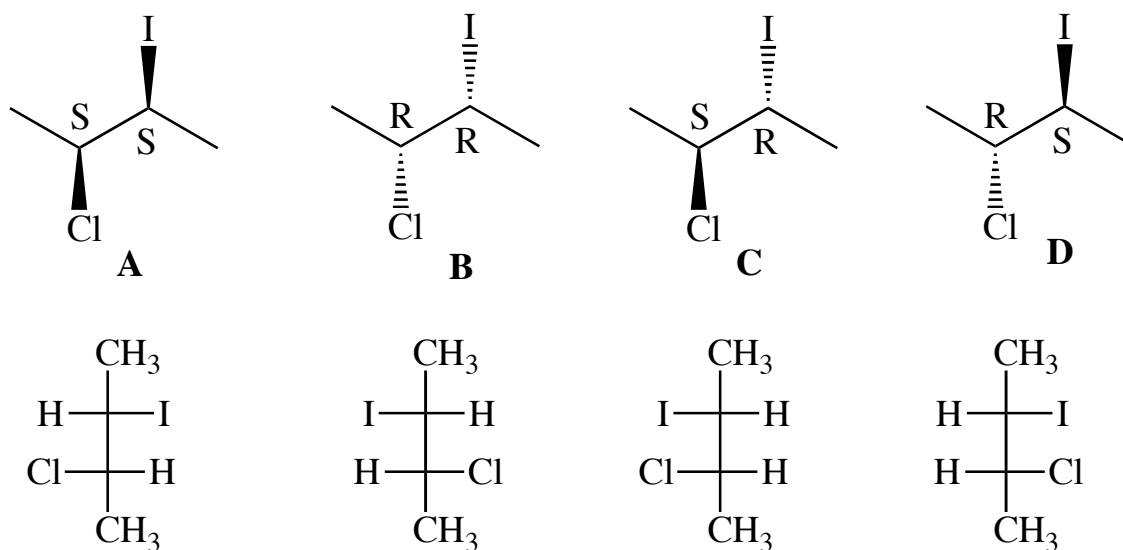
Chemistry 250 -- Stereochemistry Worksheet Answers

October 2, 2009

1. Ibuprofen is the active ingredient in Motrin, Nuprin, and Advil. It is currently sold as a racemic mixture although the (S)-enantiomer is the active pain reliever and the (R)-isomer is inactive. However the (R)-isomer is converted to the (S)-isomer in the body. Draw 3D pictures of these two enantiomers and indicate which is which. (You don't have to show the 3D structure of the entire molecule, just the stereocenter.)



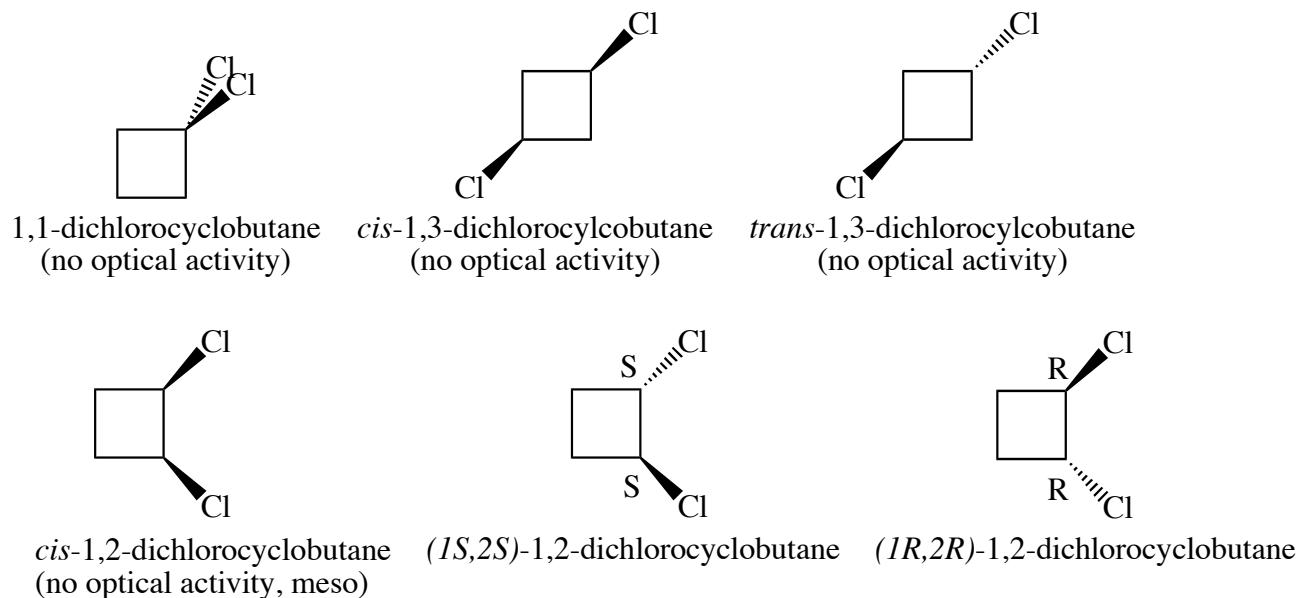
2. Draw and label all the stereoisomers of 2-chloro-3-iodobutane. (Use both perspective and Fischer projections.) Indicate which isomers are enantiomers and which are diastereomers.



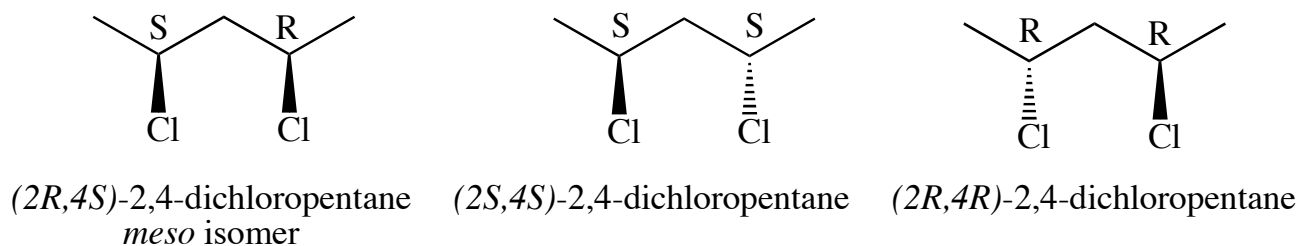
Enantiomers: A&B, C&D

Diastereomers: A and B are diastereomers of C and D

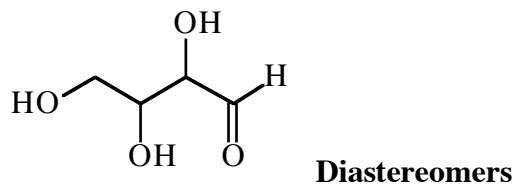
3. Draw and name all the possible isomers of dichlorocyclobutane and identify isomers with no optical activity. For any chiral molecules be sure to indicate their absolute stereochemistry.



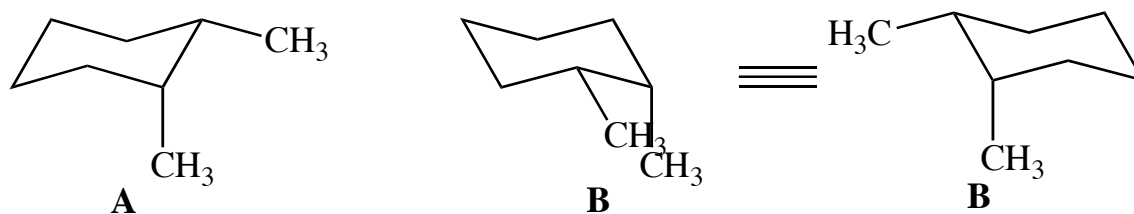
4. Draw and name the isomers of 2,4-dichloropentane. Identify the meso isomer.



5. Two sugars have been isolated with the molecular linkage shown below. One sugar, A, has and $[\alpha]_D$ of $+30.5^\circ$. The other sugar, B, has an $[\alpha]_D$ of $+13.5^\circ$. What type of isomers are A and B?

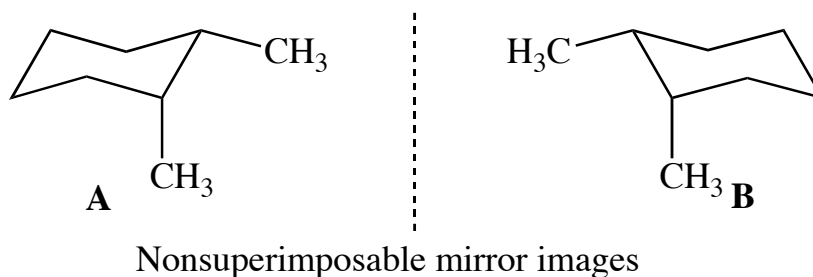


6. Draw a chair conformer for *cis*-1,2-dimethylcyclohexane. Is the molecule in the conformation you have drawn chiral or achiral? Now draw the structure for the other chair conformation. What relationship do the two conformations have? Will *cis*-1,2-dimethylcyclohexane be optically active? Why or why not?



This conformer is chiral \longrightarrow Ring flip gives this conformation \longrightarrow This is the same structure rotated 120°

Notice that **A** and **B** are enantiomers. Thus *cis*-1,2-dimethylcyclohexane is not optically active since there will be equal amounts of A and B.



7. Draw all the isomers for 1,2-diaminocyclohexane. If you were given a bottle of a mixture of these isomers, how would you obtain pure (1*S*,2*S*)-1,2-diaminocyclohexane? Hint: Look in your lab notebook.

