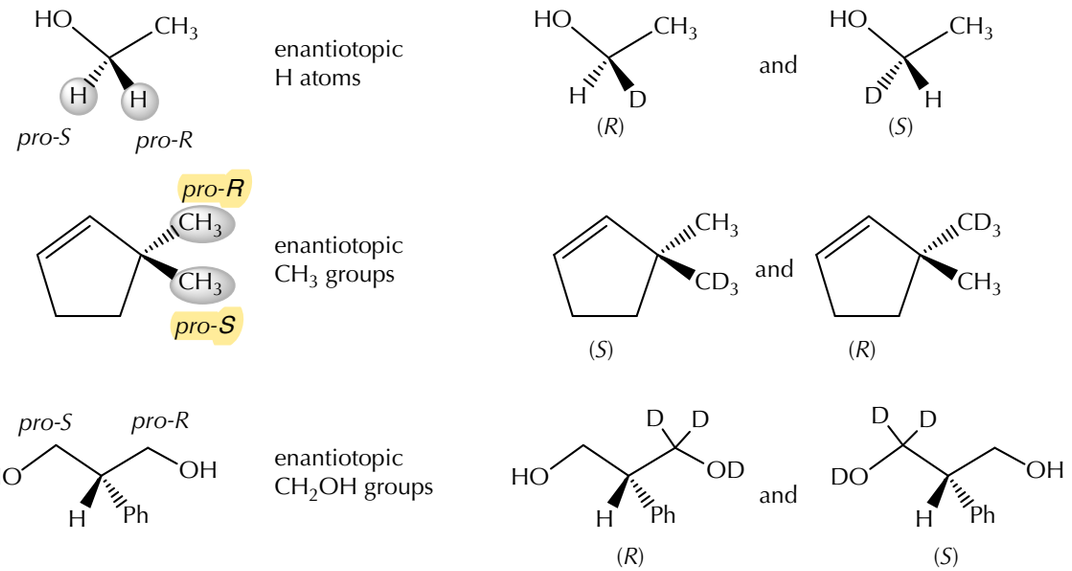
Figure AP0953

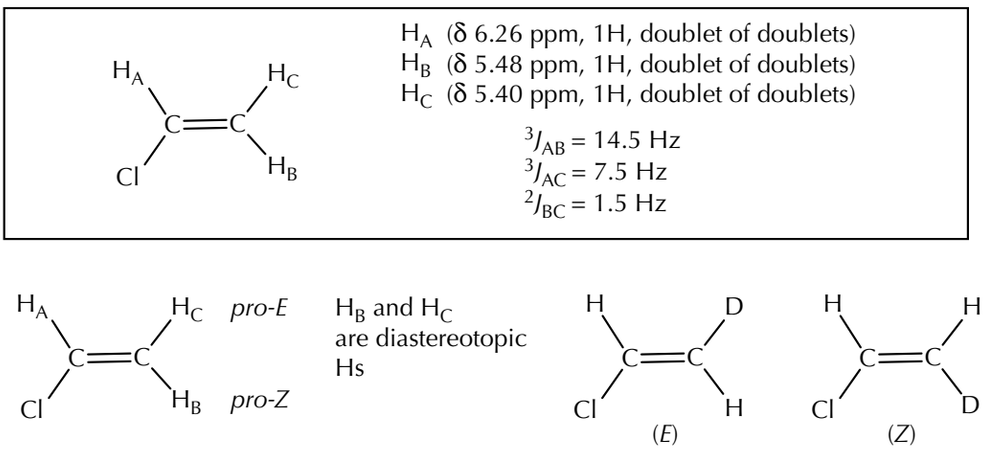
Pro-R and pro-S labels for enantiotopic atoms and groups.



In fact, you have seen examples of diastereotopic groups already, during the discussion about nonequivalent neighbors in 1-chloroethene (see Figures AP0929–AP0931). A summary of that example is provided here (Figure AP0954).

Figure AP0954

Diastereotopic atoms in 1-chloroethene.



The H/D exchange on the hydrogen atoms at carbon-2 creates (*E*)- and (*Z*)- diastereomers, and so those two hydrogens are diastereotopic. As hydrogen atoms in different groups, they have a 2-bond neighbor relationship with one another ($^2J_{HH}$), and they are nonequivalent neighbors with respect to the hydrogen atom at carbon-1, each with their own 3-bond ($^3J_{HH}$) coupling constant. Not surprisingly, the hydrogens can be labelled as *pro-E* and *pro-Z* as a way to refer to them.

By exactly the same logic (this is topology, not chemistry), if the H/D exchange at prochiral atom creates diastereomers, then those atoms or groups are diastereotopic and they are classified and behave as