When chiral compounds are formed from achiral starting materials, the product is racemic unless the racemization is carried out under the influence of an enantiomerically pure chiral environment such as starting material, reagent, solvent, or catalyst.

\[
\text{acetaldehyde} \xrightarrow{\text{HBr}} \begin{array}{c}
\text{Br} \\
\text{S} \\
\text{S}
\end{array} + \begin{array}{c}
\text{Br} \\
\text{R} \\
\text{S}
\end{array}
\]

SO:SO racemic

Each is enantiomerically pure

\[
\text{enantiomerically pure (100% S)}
\]

Diastereomers not SO:SO not racemic

\[
(R,R) + (R,S) = \text{not present}
\]

\[
\text{HBr} \xrightarrow{\text{peroxide}} \begin{array}{c}
\text{Br} \\
\text{H} \\
\text{M}
\end{array}
\]

Nonstereoselective = no preference for syn or anti addition

\[
2^2 = 4 \text{ stereoisomers}
\]

-4 products

\[
\begin{array}{c}
\text{Br} \\
\text{Br}
\end{array}
\]

\[
\begin{array}{c}
\text{Br} \\
\text{Br}
\end{array}
\]

\[
\begin{array}{c}
\text{Br} \\
\text{Br}
\end{array}
\]

\[
\begin{array}{c}
\text{Br} \\
\text{Br}
\end{array}
\]

-elim is regioselective (Br is always goes to least substituted)
Submit a Single-sided Copy to the Office
DO NOT STAPLE

Hydrogenation

plane of symmetry

actual = meso

-Stereoselective +
Stereo-specific

chiral (no plane of symmetry)