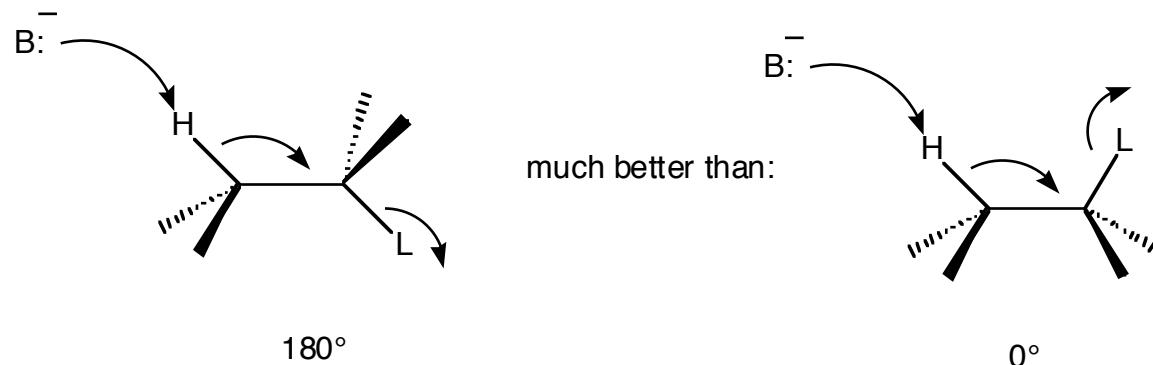


Answers to Problem 63, Chemistry 301X-2006

Develop an orbital argument for why the E2 elimination favors the  $180^\circ$  arrangement over the  $0^\circ$  arrangement.



Hint: If the C-H bond is full (it is) what orbital of C-L must it interact with?

If the CH bond is full, we must look for an empty orbital on C—L, and that is  $\sigma^*$ . Here are the two arrangements with C—H ( $\sigma$ ) and C—L ( $\sigma^*$ ) drawn in:



The  $180^\circ$  arrangement is fine, with strong overlap. By contrast,  $0^\circ$  has little overlap at all, and what there is is both bonding and antibonding. No contest.