WHICH WOULD MAKE BETTER DRIVERS: DOGS OR CATS?

ALKyne Nomenclature
(SAME AS ALKENE: PARENT CONTAINS =, LOCATOR)

9.1 Provide a systematic name for each of the following compounds:

(a) 
(b) 
(c) 
(d) 
(e) 
(f) 
(g) 

TERminal Alkynes As Acids

9.5 In each of the following cases, determine if the base is sufficiently strong to deprotonate the terminal alkyne:

(a) 
(b) 
(c) 

TABLE 9.2 SELECTED BASES AND THEIR CONJUGATE ACIDS

<table>
<thead>
<tr>
<th>Base</th>
<th>Conjugate Acid</th>
<th>pKa</th>
</tr>
</thead>
<tbody>
<tr>
<td>NaH</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>NaNH2</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>t-BuOK</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

9.7
(a) The starting material is a terminal alkynide. When treated with excess sodium amide (NaNH2), two successive E2 reactions occur (each of which requires three curved arrows, as shown below). The resulting terminal alkyne is then deprotonated to give an alkyne ion:

(b) The starting material is a vicinal dichloride. When treated with excess sodium amide (NaNH2), two successive E2 reactions occur (each of which requires three curved arrows, as shown below). The resulting terminal alkyne is then deprotonated to give an alkyne ion:

ALKyne FORMATION

9.7 For each of the following transformations, predict the major product and draw a mechanism for its formation:

(a) 
(b) 

ALKyne REDUCTION

9.9
(a) When hydrogenation is performed in the presence of a poisoned catalyst (such as Lindlar’s catalyst), the alkyne is reduced all the way to an alkane, as shown here:

(b) When hydrogenation is performed in the presence of a poisoned catalyst (such as Ni,B), the alkyne is reduced to a cis alkene. When nickel is used as the catalyst, the alkyne is reduced all the way to an alkane, as shown here:
9.10 Draw the major product expected when each of the following alkenes is treated with sodium in liquid ammonia:

(a) \[ \text{H}_2 \]

(b) \[ \text{Na} \]

(c) \[ \text{H}_2 \]

9.11 Identify reagents that you could use to achieve each of the following transformations:

(a) \[ \text{H}_2 \text{O} \]

(b) \[ \text{NaH} \]

(c) \[ \text{Na} \]

9.12 Predict the major product(s) expected for each of the following reactions:

(a) \[ \text{HCl} \]

(b) \[ \text{NaH} \]

(c) \[ \text{Na} \]

9.13 The starting alkene is terminal, and when treated with excess HCl, two successive addition reactions occur, producing a geminal dihalide. The two chlorine atoms are installed at the more substituted, secondary position, rather than the less substituted, primary position:

(a) \[ \text{Cl} \]

(b) \[ \text{Cl} \]

(c) \[ \text{Cl} \]

9.14 Suggest reagents that would achieve the following transformation:

(a) \[ \text{HCl} \]

(b) \[ \text{NaH} \]

(c) \[ \text{Na} \]

9.15 The starting material is a geminal dichloride, and treatment with excess sodium amide (followed by work-up with water) gives a terminal alkene:

(a) \[ \text{NaH} \]

(b) \[ \text{Na} \]

(c) \[ \text{HCl} \]

9.16 The starting material is a geminal dichloride, and treatment with excess sodium amide (followed by work-up with water) gives a terminal alkene. This alkene is then treated with HCl to give the desired compound:

(a) \[ \text{NaH} \]

(b) \[ \text{Na} \]

(c) \[ \text{HCl} \]