

## HW 21, chemistry 2

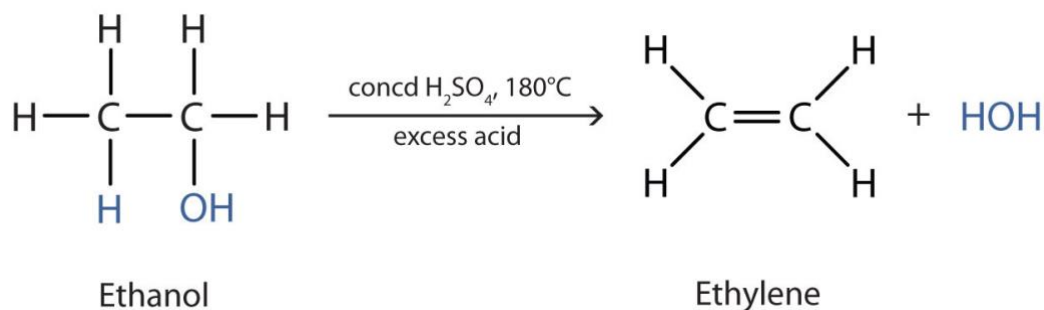
The names of a lot of substances from different classes of organic compounds can be figured out by remembering how to name alkanes with different numbers of carbons in their structures.

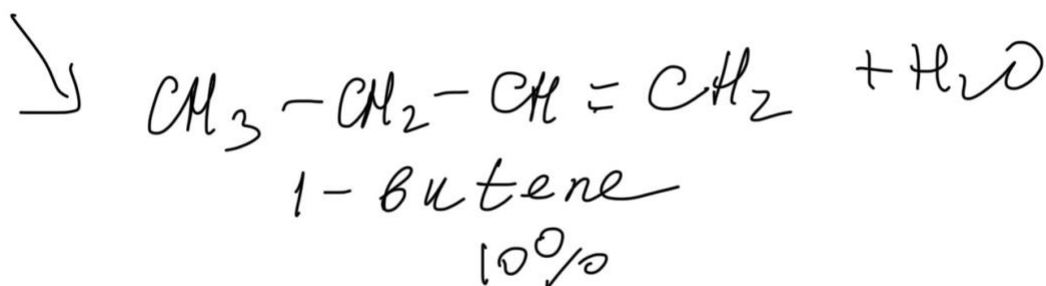
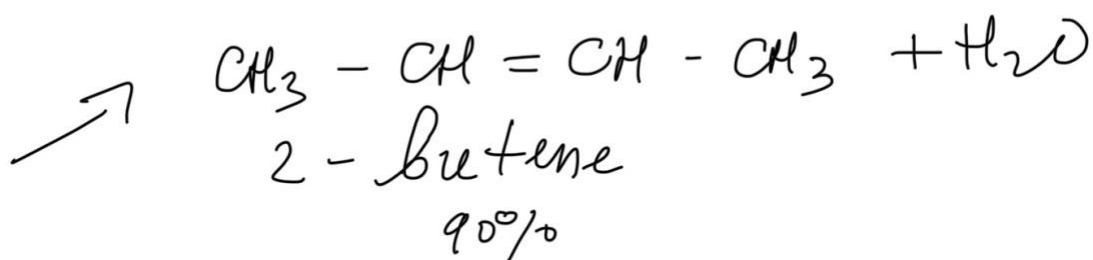
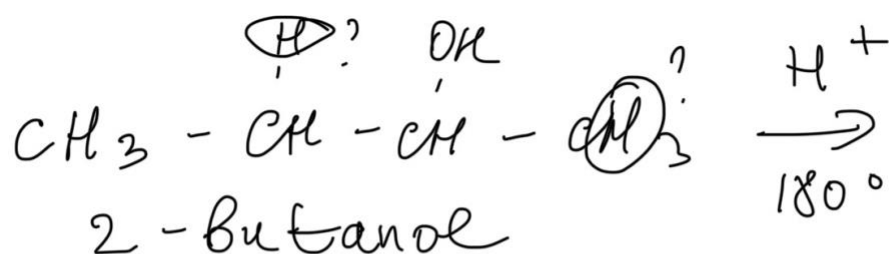
No. of C atoms	Name of alkane	Molecular formula	Name of alkyl group	Formula
1	Methane	CH <sub>4</sub>	Methyl	-CH <sub>3</sub>
2	Ethane	C <sub>2</sub> H <sub>6</sub>	Ethyl	-C <sub>2</sub> H <sub>5</sub>
3	Propane	C <sub>3</sub> H <sub>8</sub>	Propyl	-C <sub>3</sub> H <sub>7</sub>
4	Butane	C <sub>4</sub> H <sub>10</sub>	Butyl	-C <sub>4</sub> H <sub>9</sub>
5	Pentane	C <sub>5</sub> H <sub>12</sub>	Pentyl	-C <sub>5</sub> H <sub>11</sub>
6	Hexane	C <sub>6</sub> H <sub>14</sub>	Hexyl	-C <sub>6</sub> H <sub>13</sub>
7	Heptane	C <sub>7</sub> H <sub>16</sub>	Heptyl	-C <sub>7</sub> H <sub>15</sub>
8	Octane	C <sub>8</sub> H <sub>18</sub>	Octyl	-C <sub>8</sub> H <sub>17</sub>
9	Nonane	C <sub>9</sub> H <sub>20</sub>	Nonyl	-C <sub>9</sub> H <sub>19</sub>
10	Decane	C <sub>10</sub> H <sub>22</sub>	Decyl	-C <sub>10</sub> H <sub>21</sub>

To name alcohols you add ending **-ol** to the names: CH<sub>3</sub>OH methanol, C<sub>2</sub>H<sub>5</sub>OH ethanol, C<sub>3</sub>H<sub>7</sub>OH propanol, C<sub>4</sub>H<sub>9</sub>OH butanol etc. We can also indicate the position of OH group in the name, for example 3-hexanol has chain with 6 carbon atoms, OH group will be attached at the carbon number 3: CH<sub>3</sub>-CH<sub>2</sub>-CH(OH)-CH<sub>2</sub>-CH<sub>2</sub>-CH<sub>3</sub>

Chemical properties of alcohols:

The most common reaction is dehydration, 180 C and catalyst are used to dehydrate alcohols, the products are going to be corresponding alkene and water.





As you can see above, if the alcohol substance has two alkyl group attached to the carbon atom bonded to the -OH, then the dehydration can result in the formation of two products. The major product is the one that forms by removing the hydrogen from the carbon atom that has the smaller number of hydrogen atoms.

The human blood buffer system maintains a stable pH (~7.4). The main buffering system in blood is the bicarbonate ( $\text{HCO}_3^-$ ) and carbonic acid ( $\text{H}_2\text{CO}_3$ ) system:



If blood becomes too acidic (low pH, high  $\text{H}^+$  concentration),  $\text{HCO}_3^-$  reacts with excess of protons, forming carbonic acid, the acid breaks down into carbon dioxide and water,  $\text{CO}_2$  is exhaled through the lungs.

## Questions

1. Write the reaction of dehydration of 3-pentanol at 180 C.
2. Write the reaction of dehydration of cyclohexanol at 180 C.
3. What will happen if blood becomes too basic (high pH, high OH<sup>-</sup>).
4. Why ethanol used as a fuel additive?