

Organic Chemistry Experiment - Hydrocarbons

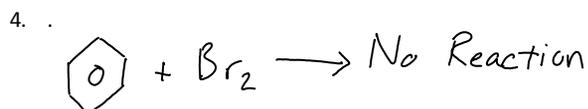
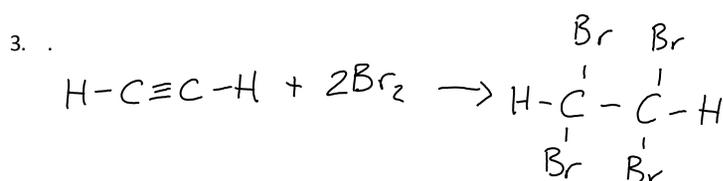
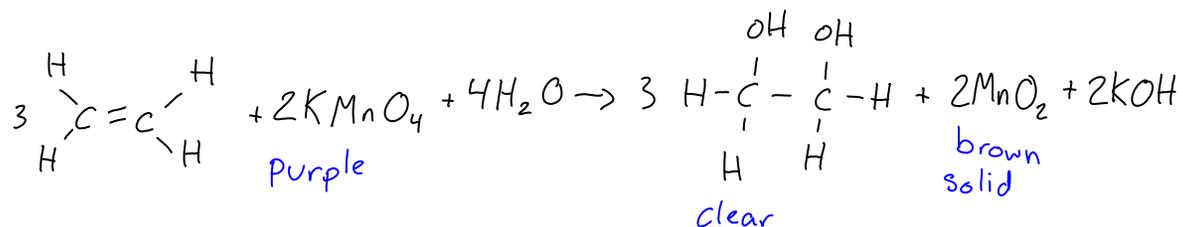
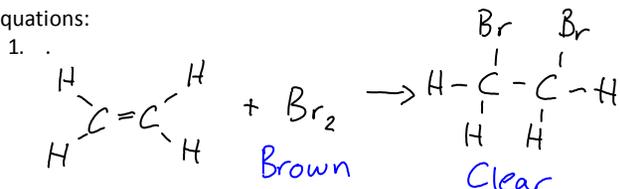
Thursday, April 12, 2007
1:34 PM

Purpose: To Identify an unknown Hydrocarbon

Procedure: Procedure listed in handout "Organic Chemistry Experiment -- Hydrocarbons"

Hazards: Open flame and hydrocarbons are flammable.

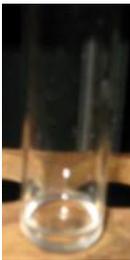
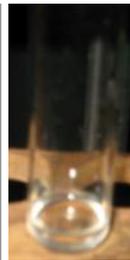
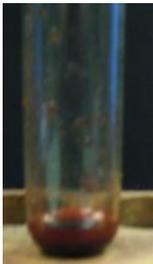
Equations:



Unknown #: 1B s-6 Hyd-3 (colorless liquid)

Data/Observations:

Test	Alkane	Alkene	Alkyne	Unknown
Bromine addition	Mixture of hexane and dichloromethane was originally clear liquid. After adding 3 drops red color Br ₂ /CH ₂ Cl ₂ the solution turned orange. Orange color held.	Alkene used was pentene. Originally clear liquid. After addition, solution turned yellowish at first but then turned clear after a few minutes of sitting.	Alkyne used was toluene. Originally clear liquid. After addition, solution turned orange. Orange maintained longer than alkene but eventually turned clear.	Originally clear liquid. After addition of unknown, turned orange but eventually faded to clear color after a few minutes of sitting.

				
Baeyer Test	Original color of potassium permanganate was a purple. Adding hexane had no visible change.	Original color: purple. After addition of pentene, the color changed to a red/brown with bubbles at the top.	Original color: purple. After addition of toluene, no change.	Original color: purple. After addition of unknown there was no color change but there was a collection of bubbles at the top similar to the alkene. Added 5 more drops and color still did not change.
				
Combustion Test	Hexane No gray smoke	Pentene had black smoke and smell that reminds me of snake fireworks. There was black ash coming off of flame too.	Toluene had black smoke and black ash	Unknown had black smoke.
Boiling Point Determination	72C	N/A no need to perform	N/A no need to perform	136C

Conclusion:

Our unknown originally was orange with addition of bromine, but after a few minutes of sitting it turned clear. This is explained because equation 4 actually did occur without a catalyst, but instead with free radical bromines being formed as light was exposed to the bromine thus bromination occurred on our benzylic ring. Note that toluene had the same result with a similar slow rate in bromination to suggest a benzylic ring.

No brown precipitate in baeyer test which excludes all alkenes in our unknown.

The combustion test of our unknown had a black flame which excludes all alkanes.

The unknown had a boiling point of 136C which is spot onto ethyl benzene. All results confirm presence of this compound.