Reactivity of Alkanes and Alkenes

Aim: To investigate the reactivity's of alkanes and alkenes.

Equipment:

- Two unknown hydrocarbon sample (one alkane, one alkene)
- 4 test tubes
- test tube rack
- Bromine Water
- 0.01M $KMnO_4$ acidified solution
- safety glasses
- fume cupboard

Method:

1. Added ten drops of each unknown substance into separate test tubes
2. Added the same amount of $KMnO_4$ to one of the test tubes for each substance.
3. Recorded Results
4. Repeated steps 1 to 3 for Bromine Water in the fume cupboard.
5. Determined which substance was an alkane and which an alkene.

Results:

Substance	Reaction with $KMnO_4$	Reaction with Bromine Water	Hydrocarbon
A	Purple	None	Alkane
B	Brown/Light Brown	Started Yellow, went clear	Alkene

$C_2H_4(l) + Br_2\ (aq) \rightarrow C_2H_4Br_2\ (l)$

Conclusion: Substance A was determined to be an alkane as it did not react with $KMnO_4$ or Bromine Water. Substance B was determined to be an alkene as it did react. This is due to the free species in an alkene as a result of the double bond between two carbon atoms.