

## Properties of Alkenes and Alkynes

### **Physical Properties**

The physical properties of alkenes and alkynes are largely dependent on the size of the molecule (number of carbon atoms) AND the number of double or triple bonds present in the molecule. As the number of carbon atoms increases, the state of matter at SATP moves from gas to liquid to solid due to increased London forces.

As the number of multiple bonds in the formula increases;

1. melting point and boiling point decrease
2. density decreases.

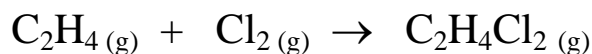
Differences in the above properties occur because multiple bonds cause kinks in the molecules leading to poor packing of the molecules and therefore decreasing the intermolecular forces.

Alkenes and alkynes are not miscible in water since they are highly non-polar but they are soluble in organic solvents.

### **Chemical Properties**

The chemical properties of alkenes and alkynes are largely dependent on the fact that alkenes and alkynes are not fully saturated. Most reactions of these molecules occur faster at SATP than those of alkanes and cycloalkanes.

Alkenes and alkynes react with halogens, hydrogen, alkylhalides and water in addition reactions.



Alkenes and alkynes react with oxygen in combustion reactions. The energy produced during the combustion of alkynes is greater than that produced in the combustion of alkenes and alkanes.