

## Question #73622, Chemistry / Physical Chemistry / Completed

Briefly give various experimental methods for studying the reaction rates

### Answer:

**Mass changes:** Mass changes that take place during a reaction can be followed by placing the reaction vessel on a balance and reading the mass at specific intervals.

**Volume changes** When a gas is given off in a reaction, that reaction can be followed by measuring the volume of gas collected at various times. To do this a reaction flask could be connected to a gas syringe.

**Pressure changes:** One useful way of following the reactions of gases if a pressure change takes place is to connect the reaction flask to a pressure meter and measuring the pressure at given intervals.

**Titration:** This could be used for following the reactions of an acid or alkali. It can also be used for following reactions involving iodine (using sodium thiosulphate). Pipette samples of the reaction mixture would be removed from the reaction vessel, placed in a flask and the reaction quenched. It can then be titrated to find the concentration of the reaction mixture at a particular time. Polarimetry (suitable for reactions involving optically active substances).

**Electrical conductivity measurement:** Is used for reaction kinetics by calibrating the conductivity-concentration. What you can do is measure the chemistry of a couple of solutions in which you measured the conductivity, which cover the range of your conductivity values. Plot those concentrations vs conductivity, fit the relationship and use it to convert the conductivities to concentration. Measuring conductivity (suitable for reactions producing or consuming ions).

**Colorimetric measurement:** If a reactant or product is coloured the reaction can be followed by using a colorimeter. This measures changes in colour intensity. A narrow beam of light is passed through the solution being investigated. The filter allows an appropriate colour of light to be selected. The start and finish solutions might be tried with different filters to see which give the largest change in reading. The meter is usually calibrated to measure the amount of light absorbed by the solution.