Heat energy changes in chemical reactions

change in heat energy when:

Salts dissolving in water

Dissolve salt in water in polystyrene cup and measure temperature change

Neutralisation reactions acid + base

Most exothermic

Endothermic: ethanoic acid + sodium carbonate

displacement reactions

Exothermic: more reactive displaces less reactive – release of energy

precipitation reactions

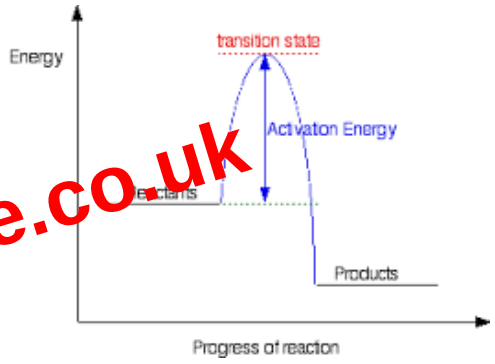
Exothermic

Exothermic Neutralisation, respiration, combustion

negative energy change: heat energy given out – products have less energy than reactants

Forming bonds releases energy

More energy released in products' formation than required to break reactants' bonds

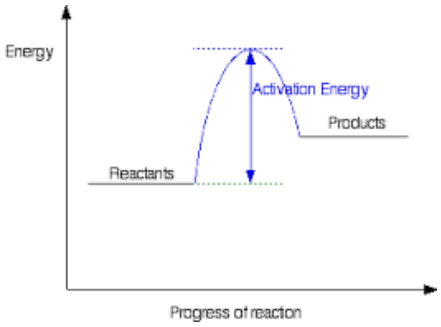


Endothermic photosynthesis, thermal decomposition

Positive energy change: heat energy taken in – products have more energy than reactants

breaking bonds needs energy

More energy needed to break reactant bonds than is released forming product bonds



Calculate energy change in a reaction given the energies of bonds (in kJ/mol)

Overall energy change = energy required to break bonds – energy released by forming bonds

activation energy

minimum amount of energy needed for bonds to break – need to be broken for new ones to form

On graph: difference between reactants & highest point