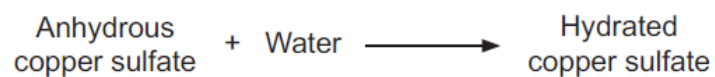


GCSE Chemistry A (Gateway Science)
J248/03 C1-C3 and C7 Higher (Higher Tier)

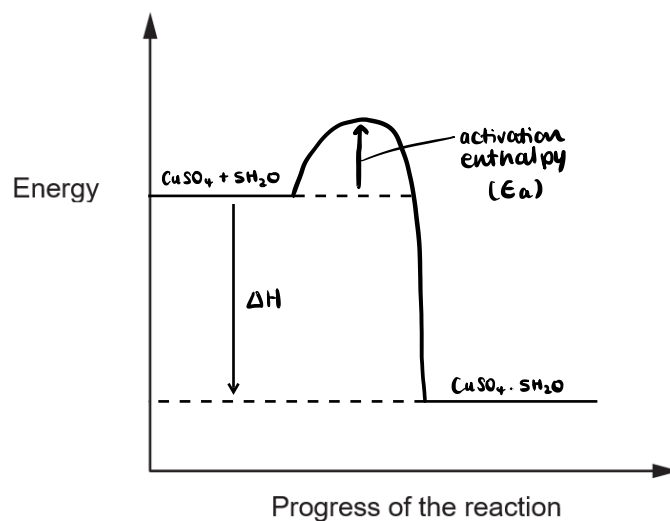
Question Set 16

1 Anhydrous copper sulfate reacts with water to make hydrated copper sulfate.



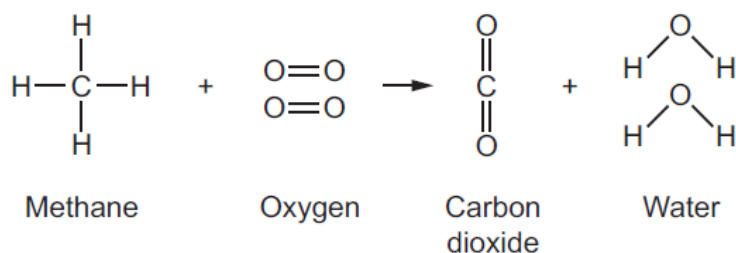
The reaction is **exothermic**.

(a) Draw and label a reaction profile for this reaction.



[3]

(b) Two students investigate the burning of methane in oxygen.



Look at the table of bond energies.

Bond	Bond energy (kJ/mol)
O-H	459
C=O	799
O=O	494
C-H	

The reaction is exothermic and 802 kJ of energy are given out when 1 mole of methane burns.

The students have looked up the bond energies. They have different values for the C-H bond energy.

Student A thinks the C-H bond energy is 432 kJ/mol. Student B thinks the C-H bond energy is 411 kJ/mol.

Who is correct? **student B**

Use the bond energies and the energy given out in the reaction to calculate the C-H bond energy.

Answer =**411**..... kJ/mol [3]

Total Marks for Question Set 16: 6

$$(799 \times 2 + 459 \times 4) - (4x + 2 \times 494) = 802$$

$$3434 - (4x + 988) = 802$$

$$2446 - 4x = 802$$

$$4x = 1644$$

$$x = 411 \text{ kJ/mol}$$

The Periodic Table of the Elements

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(0)																								
1 H hydrogen 1.0	2 He helium 4.0	3 Sc scandium 45.0	4 Ti titanium 47.9	5 V vanadium 50.9	6 Cr chromium 52.0	7 Mn manganese 54.9	8 Fe iron 55.8	9 Co cobalt 58.9	10 Ni nickel 58.7	11 Cu copper 63.5	12 Zn zinc 65.4	13 B boron 10.8	14 C carbon 12.0	15 N nitrogen 14.0	16 O oxygen 16.0	17 F fluorine 19.0	18 Ne neon 20.2														
19 K potassium 39.1	20 Ca calcium 40.1	39 Y yttrium 88.9	40 Zr zirconium 91.2	41 Nb niobium 92.9	42 Mo molybdenum 95.9	43 Tc technetium	44 Ru ruthenium 101.1	45 Rh rhodium 102.9	46 Pd palladium 106.4	47 Ag silver 107.9	48 Cd cadmium 112.4	53 I iodine 126.9	54 Xe xenon 131.3	55 Cs caesium 132.9	56 Ba barium 137.3	71 La lanthanoids	72 Hf hafnium 178.5	73 Ta tantalum 180.9	74 W tungsten 183.8	75 Re rhenium 186.2	76 Os osmium 190.2	77 Ir iridium 192.2	78 Pt platinum 195.1	79 Au gold 197.0	80 Hg mercury 200.6	81 Tl thallium 204.4	82 Pb lead 207.2	83 Bi bismuth 209.0	84 Po polonium	85 At astatine	86 Rn radon
37 Rb rubidium 85.5	38 Sr strontium 87.6	87 Fr francium	88 Ra radium	89-103 actinoids	104 Rf rutherfordium	105 Db dubnium	106 Sg seaborgium	107 Bh bohrium	108 Hs hassium	109 Mt meitnerium	110 Ds darmstadtium	111 Rg roentgenium	112 Cn copernicium	113 Nh nihonium	114 Fl flerovium	115 Mc moscovium	116 Lv livermorium	117 Ts tennessine	118 Og oganeson												

Key
atomic number
Symbol
name
relative atomic mass

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