**ANSWERS: Additional questions on enthalpy change calculations**

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| 1. i) 2 moles of Mg gives out 1200k J of energy  so, 1 moles of Mg gives out 600kJ of energy  ii) 0.35 moles of Mg gives out 600 x 0.35 = 210kJ  iii) 1 mole of Mg = 24g mol-1  so, 24g = 600kJ of energy released  1.5g will release (600 x 1.5)/24 = 37.5kJ of energy  **3.** 1640kJ needed = ? moles of sucrose needed 5650/1640 = 3.445 moles  1 mole sucrose = 342gmol-1  so 3.445 moles sucrose = 342 x 3.445 = 1178.19g | | 2. i) M(Al) = 27 g mol-1  2.1g of Al releases 70.3kJ of energy  1g of Al releases 70.3/2.1 = 33.476kJ  so 27g of Al releases 27 x 33.47 = 903.857kJ  ii) 1 mole of Al releases 903.857kJ  ratio of Al : Fe in the equation is 1:1  so, 1 mole of Fe also releases 903.857kJ  ? moles of Fe releases 240kJ  240/903.857 = 0.2655moles  1 mole Fe = 55.9gmol-1  0.2655 Fe = ? g = 0.2655 x 55.9 = 14.84g |
| 5. 1 mole of propane releases 2220kJ of energy  0.256moles = 0.256 x -2220 = -568.32kJ | | 4. M (C8H18) = 114  density = mass  volume  so mass of petrol burnt = density x volume  = 0.698 x 40 x 1000 (to convert to cm3) = 27920g  114g of petrol = 5530 kJ mol–1  27920g of petrol = ?  The energy released = 27920/114 x 5530 = 1.35 x 106 kJ |
| 6. **density = mass**  **volume**  **so, the mass of ethanoic acid is 1.05 x 1.5 x 1000 (to convert dm3 to cm3) = 1575g**  **1 mole of ethanoic acid = 60 g**  **? moles = 1575g = 1575/60 = 26.25moles**  **1 mole ethanoic acid produced liberates 356kJ of energy**  **so, 26.25 moles = 26.25 x 356 = 9345kJ of energy** | **ii) 1 mole of ethanoic acid releases 356kJ of energy**  **? moles of ethanoic acid releases 3 x 104 kJ of energy = 3 x 104/356 = 84.269 moles**  **1 mole of ethanoic acid = 60g**  **84.269 moles = ? g = 60 x 84.269 = 5056.14g**  **density = mass**  **volume**  **so volume = mass = 5056.14/1.05 = 4815.371cm3 = 4.82dm3 or 4.82L**  **density** | |

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