**Chemistry 2.4 AS 91164** Demonstrate understanding of bonding, structure, properties and energy changes



Writing Excellence answers to **Bond enthalpy** questions

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| **Bond enthalpy QUESTION** | | | | | | | | |
| **Question:**  Ethene gas, C2H4 (g), reacts with bromine gas, Br2(g), as shown in the equation below.  Calculate the enthalpy change, ∆rH°, for the reaction between ethane and bromine gases, given the average bond enthalpies in the table below. Show your working and include appropriate units in your answers. | | | | | | | | |
| **ANSWER** | | | | | | | | |
| 1. list types of bonds for reactants (bonds broken) and products (bonds formed) AND number of each, in a table. Watch for double or triple bonds as these are separate  (Draw Lewis structuresif not given) | Bonds broken (reactants) | | | | Bonds formed (products) | | | |
| 2. write bond type for each reactant (bonds broken) and product (bonds formed). Watch for double and triple bonds as they are different. Cross off on lewis diagram as you go | Bond type | number | enthalpy | Total enthalpy | Bond type | number | enthalpy | Total enthalpy |
| 3. write the number of each bond type beside  4. multiply bond enthalpy by number of each bond |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| 5. total reactant bond enthalpy and total product enthalpy |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| 6. bond broken (reactants) enthalpy total minus bond formed enthalpy (products) = enthalpy change, ∆rH°  total enthalpy and calculate enthalpy change *(sign, units and 3sgf)*  Δr*H*o = ΣBond energies(bonds broken) – ΣBond energies(bonds formed) | Total Enthalpy  (bonds broken) | | |  | Total enthalpy  (bonds broken) | | |  |
| Total enthalpy = | | | | | | | |
| 7. you may have to rearrange equation if enthalpy for a bond is required  Δr*H*o = ΣBond enthalpy (bonds broken) – ΣBond enthalpy (bonds formed) |  | | | | | | | |

NOTE: The white column is how your answer would appear on your test paper so make sure you **write out complete sentences**. The grey area is just to help you structure your answer and would not appear in the question.