



A2 PRACTICAL 4

Enthalpy of decomposition (Grid)

| | | other | 1 | 2a | 2b | 2c | 2d | 3a | 3b | 4a | 4b | 5a | 5b |
|--------------------------------|---|-------|---|----|----|----|----|----|----|----|----|----|----|
| Procedure & results | Followed instructions carefully and independently | | | | | | | | | | | | |
| | Worked safely (eye protection) | | | | | | | | | | | | |
| | Worked safely (thermometer in safe places) | | | | | | | | | | | | |
| | Value for Na ₂ CO ₃ is reasonable | | | | | | | | | | | | |
| | Value for NaHCO ₃ is reasonable | | | | | | | | | | | | |
| Recording of results | Times and temperature in suitable tables for both experiments | | | | | | | | | | | | |
| | Resolution of temperatures in line with resolution of thermometer | | | | | | | | | | | | |
| Graphs | More than half the available space used on each axis on both graphs | | | | | | | | | | | | |
| | Axes labelled with units on all axes | | | | | | | | | | | | |
| | Points correctly plotted (including average temperature for acid + alkali pre mixing) | | | | | | | | | | | | |
| | Both graphs correctly extrapolated up to 4 minutes | | | | | | | | | | | | |
| | Both graphs correctly extrapolated back to 4 minutes | | | | | | | | | | | | |
| | Temperature rise/fall correctly read from both graphs | | | | | | | | | | | | |
| Calculation | Na ₂ CO ₃ heat released correct | | | | | | | | | | | | |
| | moles of both reagent found correctly and acid shown to be in excess | | | | | | | | | | | | |
| | enthalpy change correctly calculated | | | | | | | | | | | | |
| | NaHCO ₃ heat absorbed correct | | | | | | | | | | | | |
| | moles of both reagent found correctly and acid shown to be in excess | | | | | | | | | | | | |
| | enthalpy change correctly calculated | | | | | | | | | | | | |
| | ΔH shown with correct sign in each case | | | | | | | | | | | | |
| | ΔH given to 3sf in each case | | | | | | | | | | | | |
| Clear & logical working shown | | | | | | | | | | | | | |
| Questions | Na ₂ CO ₃ apparatus uncertainty for pipette correct (0.4%) | | | | | | | | | | | | |
| | apparatus uncertainty for balance correct | | | | | | | | | | | | |
| | apparatus uncertainty for thermometer correct | | | | | | | | | | | | |
| | added to give total | | | | | | | | | | | | |
| | suitable comments on accuracy | | | | | | | | | | | | |
| | NaHCO ₃ apparatus uncertainty for pipette correct (0.4%) | | | | | | | | | | | | |
| | apparatus uncertainty for balance correct | | | | | | | | | | | | |
| | apparatus uncertainty for thermometer correct | | | | | | | | | | | | |
| | added to give total | | | | | | | | | | | | |
| | suitable comments on accuracy | | | | | | | | | | | | |
| | Can explain why balance uncertainty irrelevant in Exp 1 insignificant | | | | | | | | | | | | |
| | Works out % experimental correctly | | | | | | | | | | | | |
| | Suitable comment on accuracy | | | | | | | | | | | | |

| | Good evidence | Working towards | Description |
|----|---------------|-----------------|---|
| 1 | | | Correctly follows instructions to carry out the experimental techniques or procedures. |
| 2a | | | Correctly uses appropriate instrumentation, apparatus and materials (including ICT) to carry out investigative activities, experimental techniques and procedures with minimal assistance or prompting. |
| 2b | | | Carries out techniques or procedures methodically, in sequence and in combination, identifying practical issues and making adjustments when necessary. |
| 2c | | | Identifies and controls significant quantitative variables where applicable, and plans approaches to take account of variables that cannot readily be controlled. |
| 2d | | | Selects appropriate equipment and measurement strategies in order to ensure suitably accurate results. |
| 3a | | | Identifies hazards and assesses risks associated with these hazards when carrying out experimental techniques and procedures in the lab or field. |
| 3b | | | Uses appropriate safety equipment and approaches to minimise risks with minimal prompting. |
| 4a | | | Makes accurate observations relevant to the experimental or investigative procedure. |
| 4b | | | Obtains accurate, precise and sufficient data for experimental and investigative procedures and records this methodically using appropriate units and conventions. |
| 5a | | | Uses appropriate software and/or tools to process data, carry out research and report findings. |
| 5b | | | Sources of information are cited demonstrating that research has taken place, supporting planning and conclusions. |