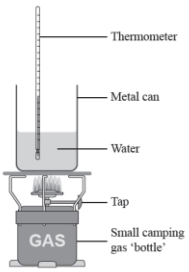
Chemistry 2.4 AS 91164 Demonstrate understanding of bonding, structure, properties and energy changes

Writing Excellence answers to **Comparing Actual and Calculated enthalpy data** questions

Comparing Actual and Calculated enthalpy data QUESTION	
Question: The accepted enthalpy change for the combustion reaction of butane gas, $C_4H_{10(g)}$, is $\Delta r\ H = -5754$ kJ mol^{-1}. Explain why calculated enthalpy is different to the accepted value. In your answer, you should include at least TWO reasons.	
ANSWER	
1. state values for both calculated data (worked out from a previous question on experimental data) and accepted data *Units, sign and 3sgf*	The value for calculated data worked out from a previous question on experimental data for the combustion reaction of butane gas is $\Delta_rH = -3370$ kJ mol^{-1} The accepted enthalpy change for the combustion reaction of butane gas, $C_4H_{10(g)}$, is $\Delta r\ H = -5754$ kJ mol^{-1}.
2. link results from experimental data to errors in experimental design	The results from this experiment are less than the accepted results, due to errors in the experimental design. The errors could include:
3. explain error number 1.	Some energy is used to heat the metal can and the air surrounding the experiment / the experiment was not conducted in a closed system, therefore not the entire amount is heating the water
4. explain error number 2.	Incomplete combustion of butane, which releases less energy per mol of heat, to transfer to the water
5. explain error number 3.	Some butane may have escaped before being ignited and therefore not all of the fuel is combusted with the heat energy transferred
6. explain error number 4. (may need only 2 or 3 in answer)	Some energy was converted to light and sound OR The butane in the gas canister was impure OR Not carried out under standard conditions etc
7. make summary statement linking that not energy released is transferred to heating the water	Therefore, not all of the energy released by the combustion of butane was transferred to heating the water, and the experimental data was calculated to be less than the actual data (carried out under error free conditions)

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.