Curiosity Thread: Why Can Combustion Products Outweigh the Fuel?

Curiosity Reading | CheAI Research Inc.

Combustion analysis is an atom-tracing idea. A product card can connect carbon in a sample to carbon dioxide and hydrogen in a sample to water, but only after a model says conversion and measurement were complete. Oxygen complicates a quick mass comparison because much of the oxygen in the products arrived as `O2` from outside the fuel sample.

1. Draw two system boundaries for a combustion record: fuel-only, and fuel plus supplied oxygen. Which boundary can satisfy a simple initial-mass/final-mass comparison?
2. Why does `CO2` data identify carbon amount but not automatically the name of the original molecule?
3. A calculation assigns oxygen by difference. List the three composition assumptions that make that reasonable.
4. Modern elemental analyzers can quantify several product gases, but why are calibration, blanks, and independent evidence still important?

Use only the packet's supplied data cards. The historical NIST references in `sources.md` describe combustion analysis as an analytical method; this packet intentionally does not give a combustion procedure.