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A student determines that a sample of an unidentified compound contains 0.8 mol sulfur and 2.4 mol oxygen. The student concludes that the chemical formula for the unidentified compound is $S_{0.8}O_{2.4}$. The student's teacher explains that this chemical formula is not possible.

- Explain why the chemical formula $S_{0.8}O_{2.4}$ is not possible.
- Identify the **most likely** chemical formula for the unidentified compound, assuming that the molar ratio is correct. Show or explain your reasoning.

A second student determines that another sample contains 0.5 mol sulfur and 1.0 mol oxygen.

- Determine whether the two students' samples are the same compound. Explain your answer.