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EXTRA CREDIT: Fireworks Chemical Reactions

Balance the following chemical reactions involved in fireworks.

1. Initially, fireworks used KNO3 as an oxidizer (source of oxygen). That reaction was:

KNO3 🡪 K2O + N2 + O2

1. In the 1830s it was discovered that KClO3 was a better oxidizer that burned hotter and allowed for more intense colors. That reaction is:

KClO3 🡪 KCl + O2

1. Using your balanced equations, answer the following:

* One mole of KNO3 produces how many moles of O2?
* One mole of KClO3 produces how many moles of O2?

1. Based on your answer to question 3, why is KClO3 a better oxidizer? How much better?
2. The oxygen released in the above reactions then combines with the sulfur and carbon in the black powder to produce hot, rapidly expanding gases that help explode the shells. Oxygen combines with sulfur to produce sulfur dioxide. Write a balanced chemical equation for this reaction.
3. Oxygen also combines with carbon to produce carbon dioxide. Write this balanced chemical equation.