

Think chemistry

Limiting reagents

What happens when
you run out of gas?

Book reference

Pages 252-256

questions 23 -25

What is a limiting reagent?

- *A limiting reagent is the REACTANT that is consumed first causing the reaction to stop
- *It's the gasoline in your car
- *It's the wood on a camp fire
- *It's gunpowder in a bullet

Solving limiting reagents

- * Find the moles of each reactant
- * Compare those moles
- * Solve for the products using the **LIMITING REAGENT!!!** This is the one that runs out first

Sample problems

- * Phosphoric acid reacts with sodium hydroxide
- * 143 grams H_3PO_4 react with 200 grams of NaOH . Find the limiting reagent

Write a balanced equation



Find the moles of each reactant

$$\frac{143 \text{ g H}_3\text{PO}_4}{1} \times \frac{1 \text{ mol H}_3\text{PO}_4}{98 \text{ g H}_3\text{PO}_4} = 1.5 \text{ mol}$$

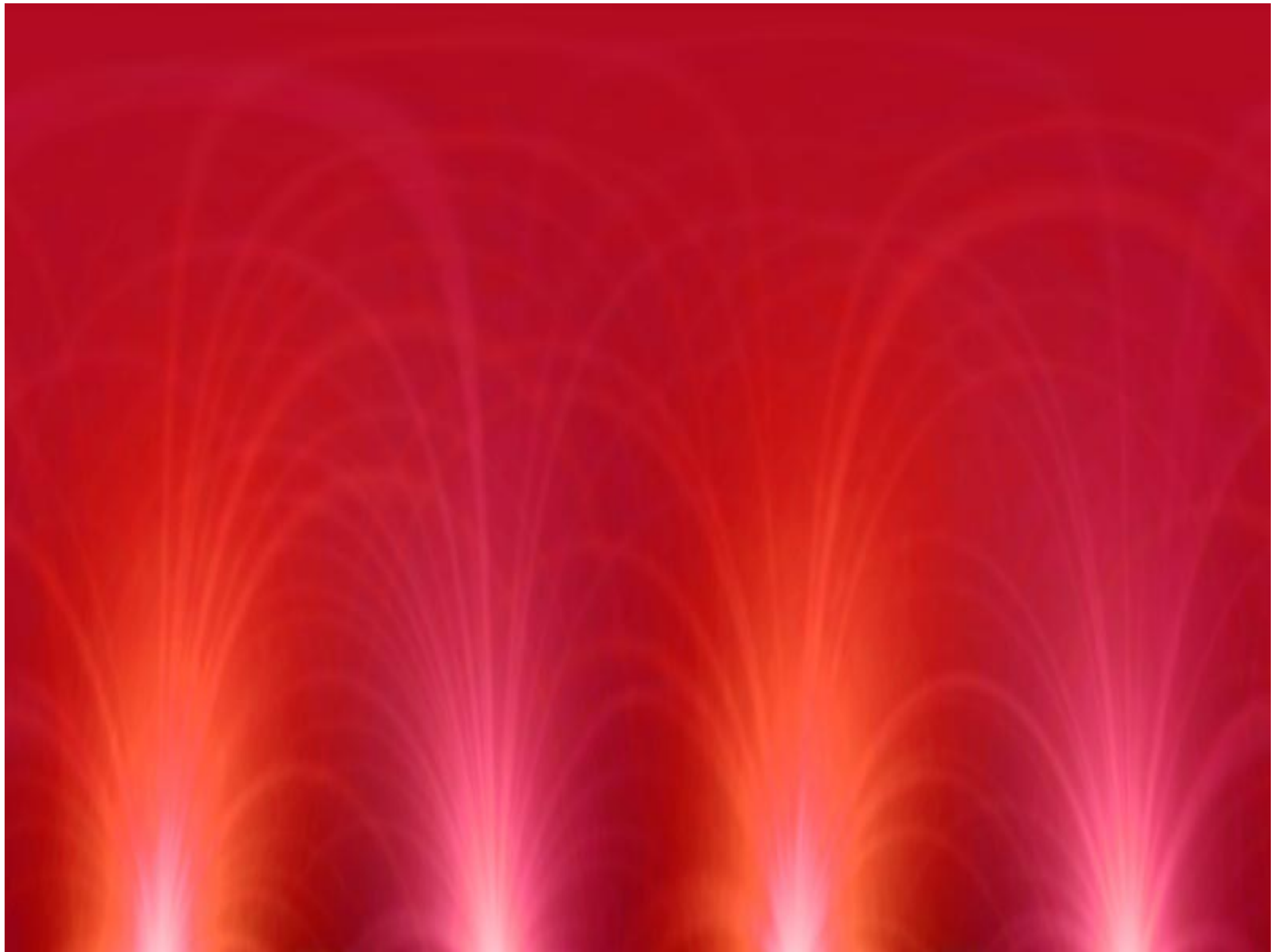
$$\frac{200 \text{ g NaOH}}{1} \times \frac{1 \text{ mol NaOH}}{40 \text{ g NaOH}} = 5.0 \text{ mol}$$

Compare the Moles

$$\frac{1.5 \text{ mol H}_3\text{PO}_4}{1} \times \frac{3 \text{ mol NaOH}}{1 \text{ mol H}_3\text{PO}_4} = 4.5 \text{ mol NaOH}$$

* You have 5.0 moles NaOH you only need 4.5 moles NaOH, so NaOH is in excess

* Which means there is not enough H₃PO₄
So H₃PO₄ is the limiting reagent



You Try

5.0 grams of H₂ combine with 64 grams of O₂ to form H₂O. Find the limiting reagent.

