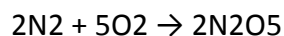


Question #73749, Chemistry / Other / Completed

Dr. Gray had 89.4 grams of nitrogen gas and 230 grams of oxygen gas. Which reactant will limit his production of dinitrogen pentoxide? How many grams of dinitrogen pentoxide will be produced?



Solution

Given:	89.4 g		x		
	2N ₂	+	5O ₂	→	2N ₂ O ₅
	2x28.014 g/mol		5x31.998 g/mol		

x – the mass of O₂ theoretically required.

$x = 5 \times 31.998 \text{ g/mol} \cdot 89.4 \text{ g} / 2 \times 28.014 \text{ g/mol} = 255.285 \text{ g}$. So we have only 230 g. Oxygen will limit the reaction.

Given:			230 g		y
	2N ₂	+	5O ₂	→	2N ₂ O ₅
			5x31.998 g/mol		2x108.01 g/mol

$$y = 2 \times 108.01 \text{ g/mol} \cdot 230 \text{ g} / 5 \times 31.998 \text{ g/mol} = 310.55 \text{ g}$$

Answer: Oxygen; 310.55 g.