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?

$2N_2 + 5O_2 \rightarrow 2N_2O_5$

Solution

Given:	89.4 g		*x*		
	$2N_2$	+	$5O_2$	→	$2N_2O_5$
	2x28.014 g/mol		5x31.998 g/mol		

x – the mass of O_2 theoretically required.

x = 5x31.998 g/mol · 89.4 g / 2x28.014 g/mol = 255.285 g. So we have only 230 g. Oxygen will limit the reaction.

Given:			230 g		y
	$2N_2$	+	$5O_2$	→	$2N_2O_5$
			5x31.998 g/mol		2x108.01 g/mol

y = 2x108.01 g/mol · 230 g / 5x31.998 g/mol = 310.55 g

Answer: Oxygen; 310.55 g.