

### Answer on Question #68929, Physics / Other

A compound of 10ml of nitrogen and oxygen mixed with 30ml H<sub>2</sub> and get H<sub>2</sub>O(l) and nitrogen gas. if both reactants react properly then what is the molecular formula of compound?

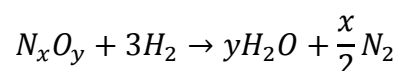
#### Solution:

Gases occupying a volume at the same temperature and pressure have the same number of molecules. Hence, we can directly take out the ratio of moles that reacted:

Gas volume Ratio of the nitrogen oxide and H<sub>2</sub> is 10:30 or simplified, 1:3.

Hence, the mole ratio of the nitrogen oxide and H<sub>2</sub> is 1:3.

Assuming the reactants and products are in gas phase at RTP:



From equation for hydrogen

$$3 \times 2 = y \times 2$$

Thus,

$$y = 3$$

For nitrogen

$$x = \frac{x}{2} \times 2$$

$$x = x$$

Thus,  $x$  can be any even number.

$$x = 2$$

**Answer:** Dinitrogen trioxide N<sub>2</sub>O<sub>3</sub>