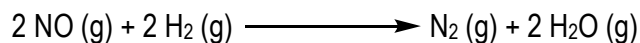<u>**CONCEPT:**</u> STOICHIOMETRIC RATE CALCULATIONS

● When the rate of one compound is known, the rate of another can be calculated using _____ comparison.

EXAMPLE: If the rate of decomposition of H_2 is 1.54 M/min at a particular time, what would be the rate of formation of N_2 at that same time.

$$2\ NO\ (g) + 2\ H_2\ (g) \longrightarrow N_2\ (g) + 2\ H_2O\ (g)$$


STEP 1: If rate of change for one compound is not given, then first calculate it using information provided.

STEP 2: Using the rate of one compound, perform a rate to rate comparison using stoichiometric coefficients.

□ Similar to mole to mole comparison used in stoichiometry.

PRACTICE: The formation of alumina, Al_2O_3, can be illustrated by the reaction below:

$$4\ Al\ (s) + 3\ O_2\ (g) \longrightarrow 2\ Al_2O_3\ (s)$$
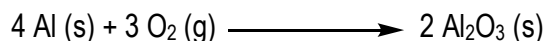
At 750 K it takes 267 seconds for the initial concentration of Al_2O_3 to increase from 6.18×10^{-5} M to 5.11×10^{-4} M. What is the average rate of Al?

a) 8.41×10^{-7} M/s   b) 1.68×10^{-6} M/s   c) 3.36×10^{-6} M/s   d) 4.21×10^{-7} M/s