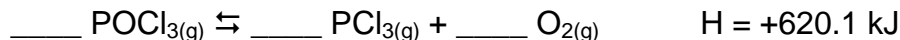


## Le Châtelier's Principle Homework

- 1) What direction will the equilibrium shift in the reaction:



if we make the following changes to the system:

- Add  $\text{PCl}_3$ ?
  - Increase the pressure?
  - Increase the volume?
  - Increase the temperature?
- 2) Explain why increasing the temperature of an exothermic system causes the equilibrium to shift toward the reactants.
- 3) Explain why the addition of a catalyst doesn't change the position of an equilibrium.
- 4) In the early 1930's Dr. Fred Allison "discovered" element 87, which he called Virginium (Vi). To isolate it he proposed the following reaction:



Though this discovery was eventually discredited\*, explain two things that he could have done to make this reaction form a greater quantity of  $\text{HViO}$ .

\* This wasn't the first element that Dr. Allison claimed to have discovered. Using a machine that utilized a process he invented (and named after himself), he also claimed to have discovered element 85, which he called "Alabamine." In 1934 it was demonstrated by Dr. H.G. MacPherson at UC Berkeley that both Allison's method and discoveries were wrong. Due to this screw up, Allison was singled out by Nobel Laureate Irving Langmuir as somebody who practiced "pathological science", a term Langmuir also used in the same speech to describe flying saucers and ESP. (sources: <http://216.247.205.102/path/allison.html>, <http://www.cs.princeton.edu/~ken/Langmuir/langmuir.htm>)