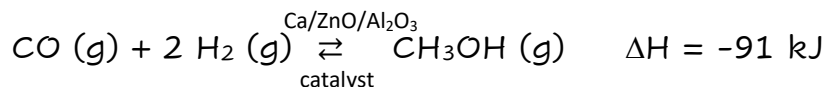


## Le Chatelier's Principle

1. Consider the following equation to answer the questions below.



Indicate if the yield of CH<sub>3</sub>OH will increase, decrease, or have no effect with the following changes:

- a) concentration of H<sub>2</sub> is increased  
*increase*
- b) concentration of CO is decreased  
*decrease*
- c) the pressure is increased by decreasing the volume  
*increase*
- d) the temperature is increased  
*decrease*
- e) remove the catalyst  
*no effect on equilibrium position*
- f) sulfuric acid is added and reacts with CO  
*decrease*
- g) decrease the temperature  
*increase*
- h) add some argon gas  
*no effect on equilibrium position*
- i) remove some methanol  
*increase*
- j) continuously remove methanol as it is formed  
*system will never reach equilibrium.*