

Separate Science - Chemistry - Key Stage 4

C10 Using Resources

# Higher tier - The economics of the Haber process

Miss Offer



# Independent task - Recall questions

## Answer the following questions:

1. Which process is used to extract nitrogen from the air?
2. Why is extracting nitrogen from the air an expensive process?
3. What is the word equation for the extraction of hydrogen from methane?
4. What is the balanced symbol equation for the production of ammonia from hydrogen and nitrogen?
5. If the pressure was increased in the Haber process, what would happen to the yield of ammonia?
6. Why are very high pressures not used in the Haber process?



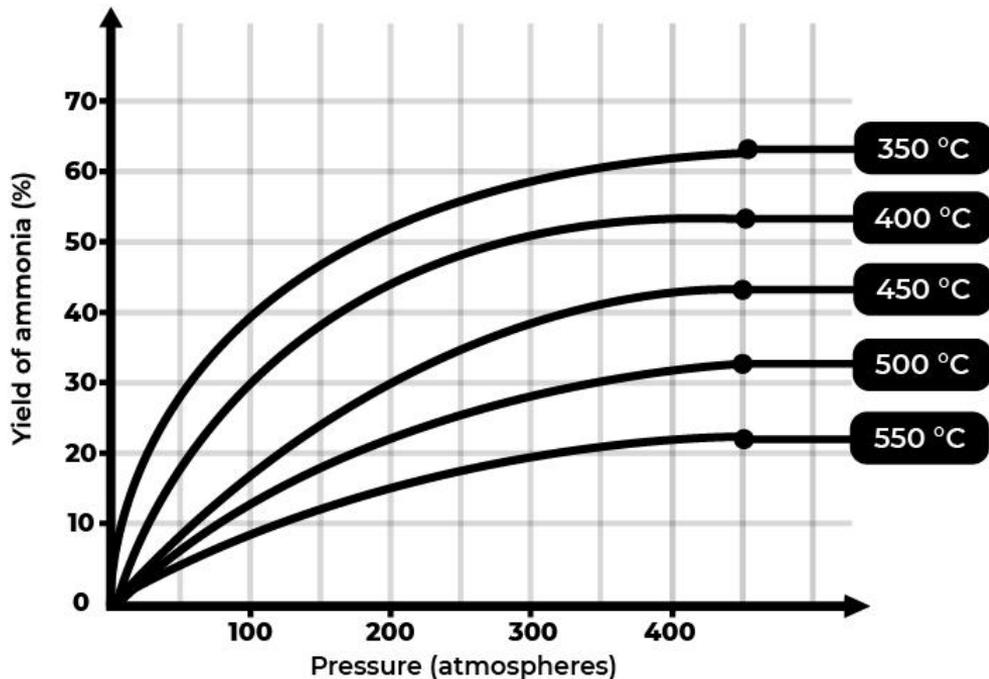
# Independent task - Recall questions

## Answer the following questions:

1. What is meant by an exothermic reaction?
2. Is the forwards reaction in the Haber process an endothermic or exothermic reaction?
3. What is the effect of reducing the temperature on the yield of ammonia?
4. Why is a low temperature not used in the Haber process?
5. Why is an iron catalyst used in the Haber process?



# Independent task - Interpreting graphs



What is the approximate yield of ammonia at:

- a. 350°C and 400 atmospheres
- b. 450°C and 400 atmospheres
- c. 350°C and 200 atmospheres
- d. 450°C and 200 atmospheres
- e. 550°C and 100 atmospheres

