

## Chemguide – questions

### EXTRACTION OF METALS: ALUMINIUM

1. If your syllabus doesn't expect you to be able to describe the extraction of aluminium oxide from bauxite, then ignore this question.
  - a) The bauxite is treated with moderately concentrated sodium hydroxide at temperatures of between 140 and 240°C, and pressures of up to 35 atmospheres. Why does the pressure have to be so high?
  - b) Assuming that the aluminium oxide in the ore reacts with the sodium hydroxide to form sodium tetrahydroaluminate solution, write the equation for the reaction.
  - c) What happens to other compounds in the bauxite like iron(III) oxide?
  - d) How is the sodium tetrahydroaluminate solution converted into aluminium oxide?
  - e) The waste product from this process is “red mud”. Why is it red?
2. In the electrolytic extraction of aluminium from aluminium oxide:
  - a) What is the molten electrolyte?
  - b) What are the anodes made of?
  - c) What is the cathode made of?
  - d) What keeps the electrolyte molten?
  - e) Which electrode is the aluminium released at?
  - f) Explain why the electrode reaction at the other electrode causes problems.
  - g) Give two factors in the process which add to the expense.

(I am not asking questions about the environmental consequences of the process. If your examiners ask questions about this, find out what they want you to say, and just learn that.)
3. Choose any two different uses of aluminium and explain what makes aluminium especially useful for each application.
4.
  - a) How do you anodise aluminium?
  - b) What are the advantages of anodised aluminium?