The element boron forms a series of hydrides, which includes $\text{B}_2\text{H}_6$, $\text{B}_4\text{H}_{10}$, $\text{B}_5\text{H}_9$, $\text{B}_6\text{H}_{10}$, and $\text{B}_{10}\text{H}_{14}$. Which one of these hydrides consists of 85.63% boron by mass?

Complete the following table.

<table>
<thead>
<tr>
<th>Formula</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{K}_2\text{SO}_4$</td>
<td>copper(II) chloride</td>
</tr>
<tr>
<td>$\text{SF}_4$</td>
<td>potassium chromate</td>
</tr>
</tbody>
</table>
Solid sodium hydroxide reacts with carbon dioxide to produce sodium carbonate and water. Calculate the mass of sodium hydroxide required to prepare 53.0 g of sodium carbonate.

Answer:

Analysis of an unknown compound returned the following percentage composition by weight:

- nitrogen: 26.2%
- chlorine: 66.4%
- hydrogen: 7.5%

What is the empirical formula of this compound?

Answer:
The active ingredient in superphosphate fertilizer is calcium dihydrogenphosphate, \( \text{Ca} \text{(H}_2\text{PO}_4) \text{)}_2 \). It is made by treating insoluble rock phosphate, \( \text{Ca}_3\text{(PO}_4\text{)}_2 \) with sulfuric acid. The other product of the reaction is calcium sulfate. Write the molecular equation for the reaction.

What mass of sulfuric acid is needed to convert 1.0 tonne (1000 kg) of rock phosphate to superphosphate?

Analysis of an unknown compound returned the following percentage composition by weight:

- nitrogen: 26.2%
- chlorine: 66.4%
- hydrogen 7.5%

What is the empirical formula of this compound?