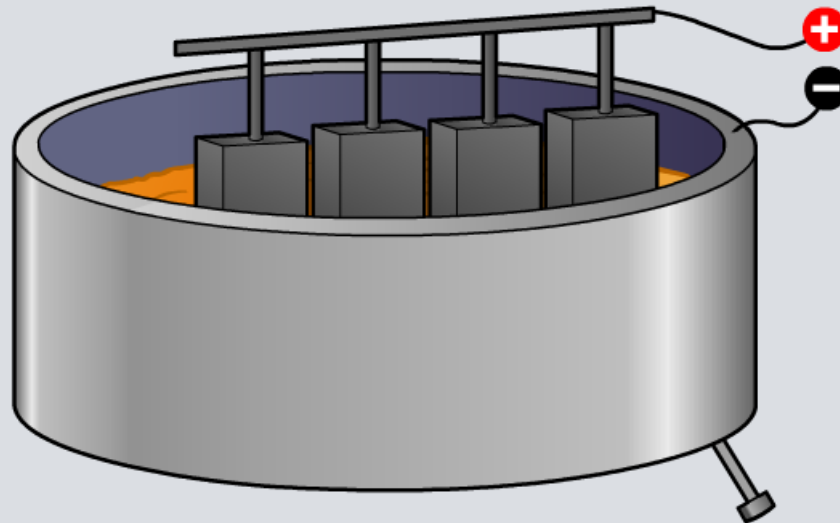


## Extracting Aluminum



# Why and how is aluminum extracted?

Aluminum is one of the most useful metals in the world.

Electrolysis is used to extract aluminum from its ore. Why is it not possible to extract aluminum by heating its ore with carbon?



Dr John Mileham

Aluminum ore (bauxite) has a very high melting point (2050 °C).

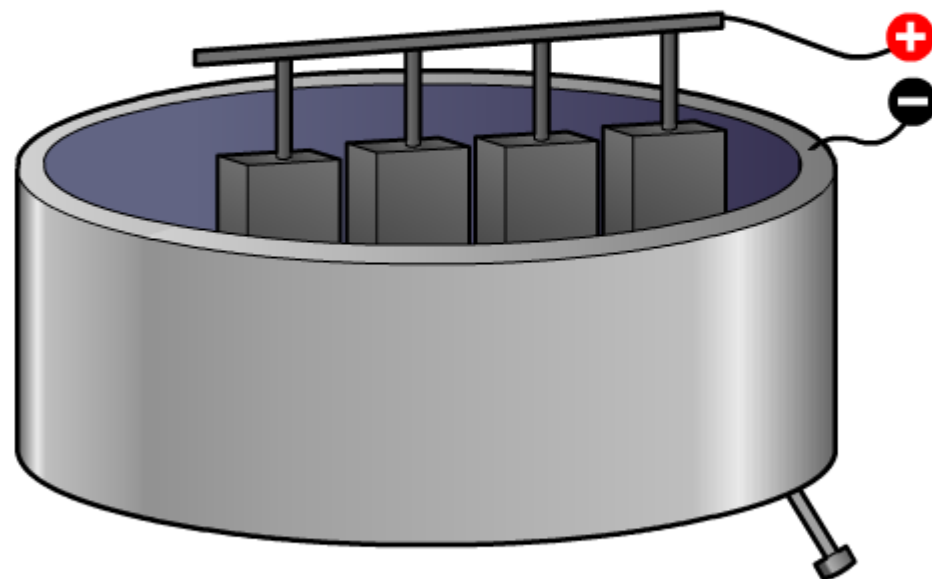
For electrolysis, the ore is dissolved in a compound called **cryolite** ( $\text{Na}_3\text{AlF}_6$ ), which lowers the melting point to 700 °C. Why is this important economically?

## How is aluminum extracted by electrolysis?

Bauxite is the main ore of aluminum.

This ore consists mainly of aluminum oxide ( $\text{Al}_2\text{O}_3$ ).

Click "play" to find out how electrolysis is used to extract aluminum from its ore.



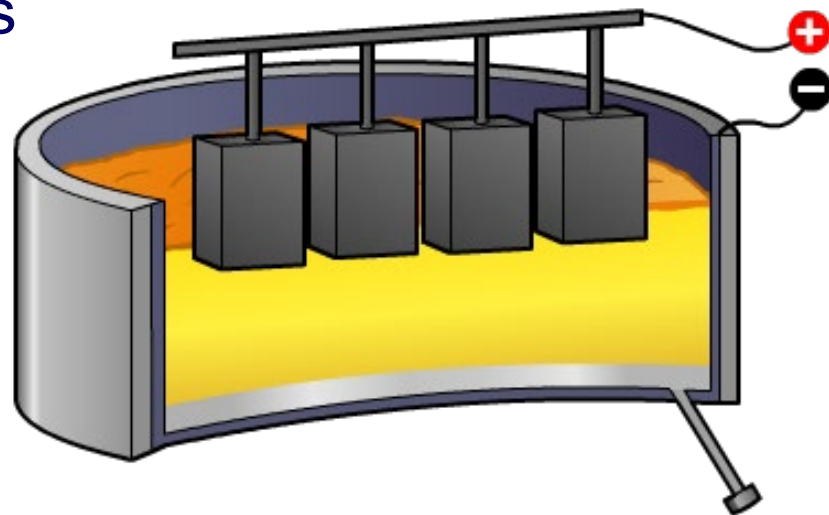
# Extracting aluminum – redox equations

What redox processes occur at the electrodes during the electrolysis of aluminum oxide ( $\text{Al}_2\text{O}_3$ )?

**At the negative electrode:**

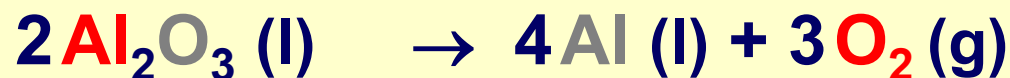


**At the positive electrode:**



What is the overall equation for the extraction of aluminum by electrolysis?

aluminum **oxide** → aluminum + **oxygen**



# Extracting aluminum – summary



# What are the products of electrolysis?

Complete the table for each molten ionic compound.

Molten ionic compound	Product at the negative electrode	Product at the positive electrode
lead bromide	lead	<input type="text" value="?"/>
lead chloride	<input type="text" value="?"/>	chlorine
aluminum chloride	<input type="text" value="?"/>	<input type="text" value="?"/>
<input type="text" value="?"/>	aluminum	oxygen
copper chloride	<input type="text" value="?"/>	chlorine



**solve**

