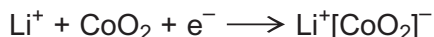


- 5 (a) Lithium ion cells are used to power cameras and mobile phones. A simplified representation of a cell is shown below.



The reagents in the cell are absorbed onto powdered graphite that acts as a support medium. The support medium allows the ions to react in the absence of a solvent such as water.

The half-equation for the reaction at the positive electrode can be represented as follows.



- 5 (a) (i) Identify the element that undergoes a change in oxidation state at the positive electrode and deduce these oxidation states of the element.

Element .....

Oxidation state 1 .....

Oxidation state 2 ..... (3 marks)

- 5 (a) (ii) Write a half-equation for the reaction at the negative electrode during operation of the lithium ion cell.

..... (1 mark)

- 5 (a) (iii) Suggest two properties of platinum that make it suitable for use as an external electrical contact in the cell.

Property 1 .....

Property 2 ..... (2 marks)

- 5 (a) (iv) Suggest **one** reason why water is **not** used as a solvent in this cell.

.....

..... (1 mark)



- 5 (b)** The half-equations for two electrodes used to make an electrochemical cell are shown below.



- 5 (b) (i)** Write the conventional representation for the cell using platinum contacts.

.....  
(2 marks)

- 5 (b) (ii)** Write an overall equation for the cell reaction and identify the oxidising and reducing agents.

Overall equation .....

.....  
.....

Oxidising agent .....

Reducing agent .....  
(3 marks)

12
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Turn over for the next question

Turn over ►

