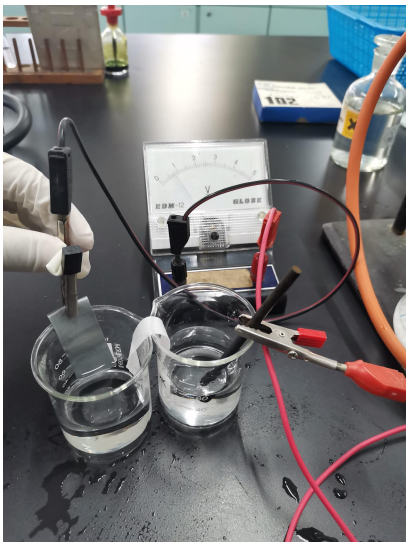
Report

Figure 1



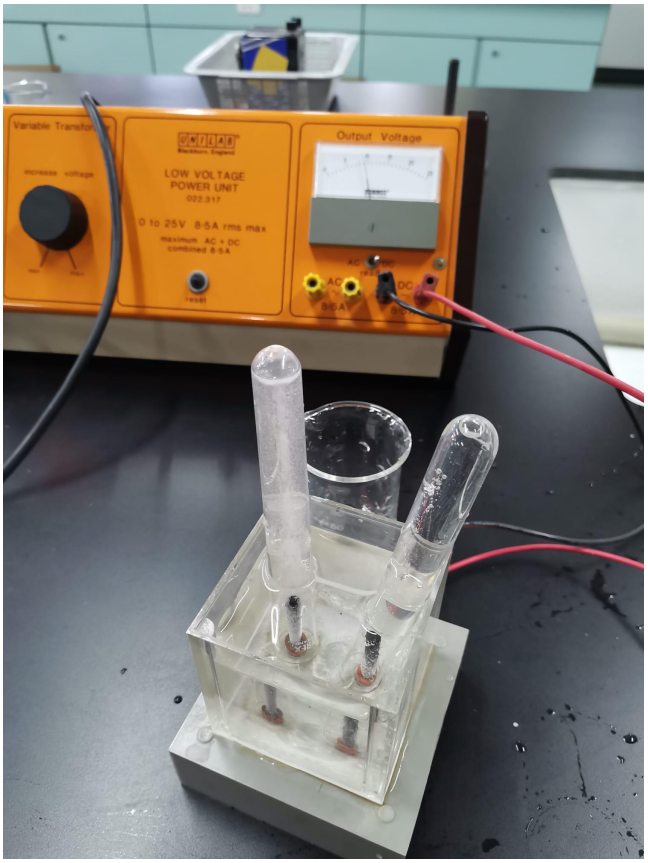
First, we decided to use a chemical cell to break down carbon dioxide to hydrogen. The advantage of the cell is that it can also provide electricity during the reaction.

For the chemical cell, we chose to use a cell as Figure 1. The solution we used is potassium hydroxide and carbonic acid(sea water mixed with carbon dioxide). The anode is a piece of zinc which is immersed in potassium hydroxide and the cathode is a rod of graphite which is immersed in carbonic acid.

For the carbonic acid, we tried using three types of liquids to mix with carbon dioxide, including deionized water, tape water and salt water(salt+tap water). Comparing the voltage of the chemical cell with these three independent variables, we concluded that the best use of liquid is salt water due to the largest output of voltage.

However, we found some problems after doing the experiment which are the low efficiency of the production of hydrogen and low output of voltage. Therefore we decided to use another method to break down carbon dioxide, electrolysis.

Electrolysis :



We tried using three different solutions for making carbonate acid, including deionized water, tape water and salt water.

-Deionized water
Observe:Increase the voltage to maximum, no reaction.
Reason:not delocalized electrons for the water and carbon dioxide to react.
-Tape water
Observe:Increase the voltage to maximum, no reaction.
Reason:not enough delocalized electrons for the water and carbon dioxide to react.
-Sea water
Observe:start to release hydrogen when the voltage reached 9V.And the reaction rate increase when the voltage increase.
Reason:There are enough delocalized electron for the water and carbon dioxide to react.

Based on the result, we could obtain the hydrogen from the solution(sea water+carbon dioxide) and it could break down lots of carbon dioxide.

After finishing the electrolysis, we used universal indicator found that the pH value is around 7. We realise that we have to design a delivery device to remove the HCO_3^- solution. Also, this change can refill new solution and convey carbon dioxide. We suppose the new device can transfer solutions smoothly and fast. Second, we found that half of carbon dioxide can't dissolve in the water completely. In this situation, we think we have to make another device that can make sure the percentage of carbon dioxide dissolves in water up to 80%.