

Physics and Chemistry Project

Made by Soheib Daadi Lachi.

Materials (I)

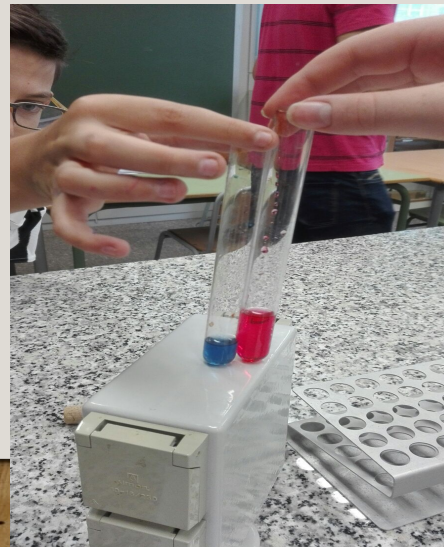
- Thermometer: to measure the temperature
- Pipette to put substances
- pH indicator
- 2 assay tubes
- NaOH 1M
- HCl 0.5 M

Procedure

- First, in the test tube A we put 2.5 ml of 1M NaOH and two drops of the pH indicator
- Then, in the test tube B we put 5 ml of 0.5 M HCl and two drops of the pH indicator

TUB A

NaOH



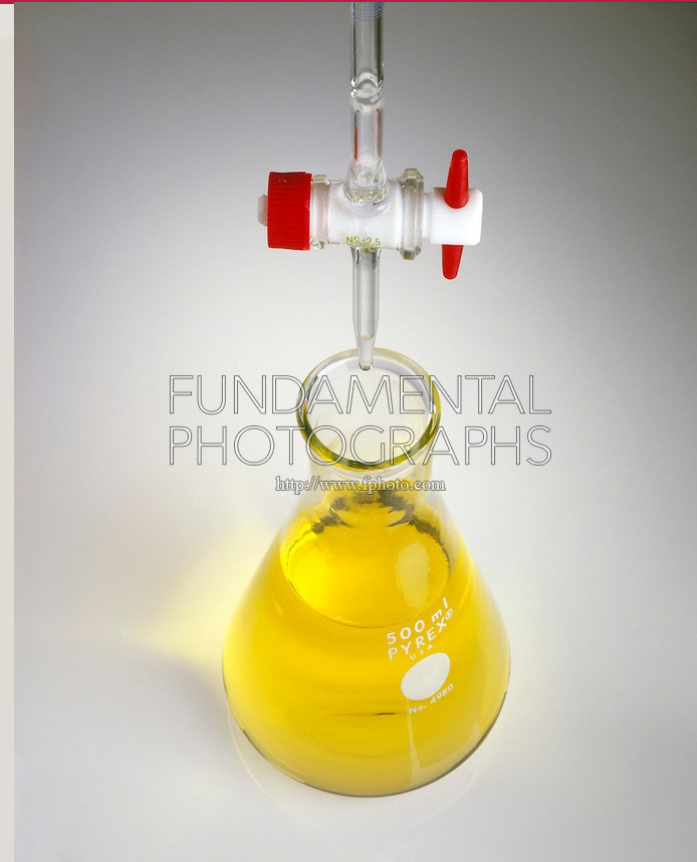
TUB B

HCl

Results

- **NaOH+HCl**

The result is a yellow liquid like this and write down it on the data table.



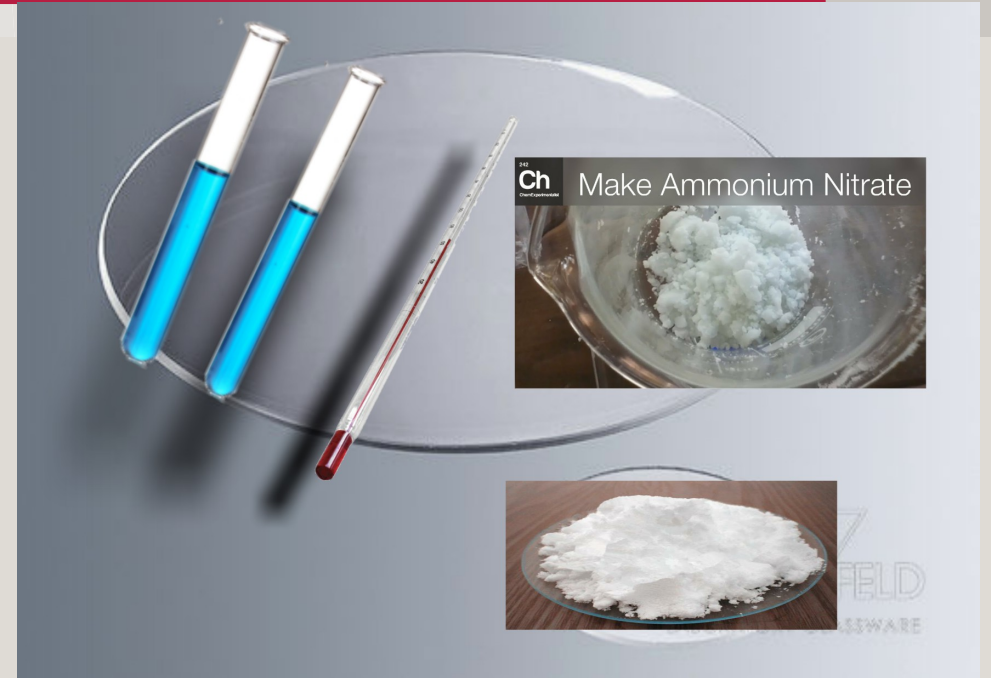
The data table (I)

- This is the data table, we write the data on it. (this is the exothermic reaction)

A	Blue	24°C
B	Purple	24°C
The mix	Yellow	26°C

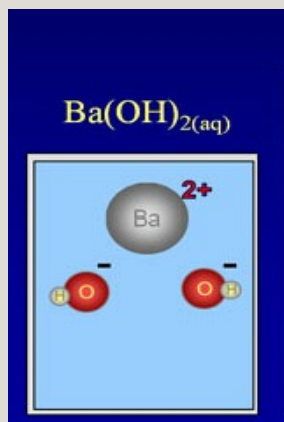
Materials (ii)

1. Two test tubes: to mix and see results
2. A thermometer: to measure the temperature
3. NH_4NO_3 in a test tube
4. $\text{Ba}(\text{OH})_2$ in another test
5. Crystal watch

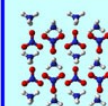
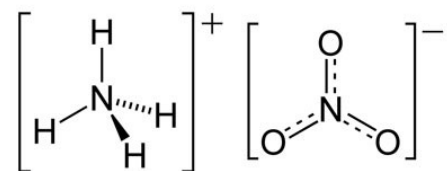


Procedure

- First take NH_4NO_3 (ammonium nitrate), put on the crystal watch 0'600 g and put into glass test tube.
- Then take $\text{Ba}(\text{OH})_2$ (barium hydroxide), put on the watch glass 0'642 g and put it into a test tube.



After we mix it



- Fórmula: NH_4NO_3
- Masa molecular: 80,04 g/mol
- Punto de fusión: 169,6 °C
- Punto de ebullición: 210 °C (descomposición)
- Densidad: 1,72 g/ml
- Nº CAS: 6484 - 52 - 2
- LD₅₀: 2,217 mg/kg (rata)



Results

- The result of the mixture of NH_4NO_3 and $\text{Ba}(\text{OH})_2$ is a very cold liquid is approximately 8°C And everything we do point in the table.



Data table (II)

The data table as follows: (endothermic reaction)



First temperature	21°C
Last temperature	8°C

To calculate the energy

- To calculate the energy in the test tube we need this formulae:

- $$E = M \cdot Ce (T_f - T_i)$$

- For example = 1'242 g Ce = specific heat $T_i = 21^\circ\text{C}$

$$T_f = 8^\circ\text{C}$$

$$E = 1'242 \times 1 (8 - 21) \quad E = 1'242 \times (-13) \quad E = -16'146 \text{ cal}$$

- To pass it on Joules = $1 \text{ cal} = (4'18 \text{ J}) \quad -16'146 \text{ cal} \times 4'18 = -67'49028 \text{ J}$

conclusion

In conclusion, the formulae " $E=M \cdot C_e(T_f-T_i)$ " serves to calculate the energy ejected in the form of heat. While the endothermic reaction decreases the temperature of the mixture, the exothermic reaction increases the temperature of the mixture.

The end

