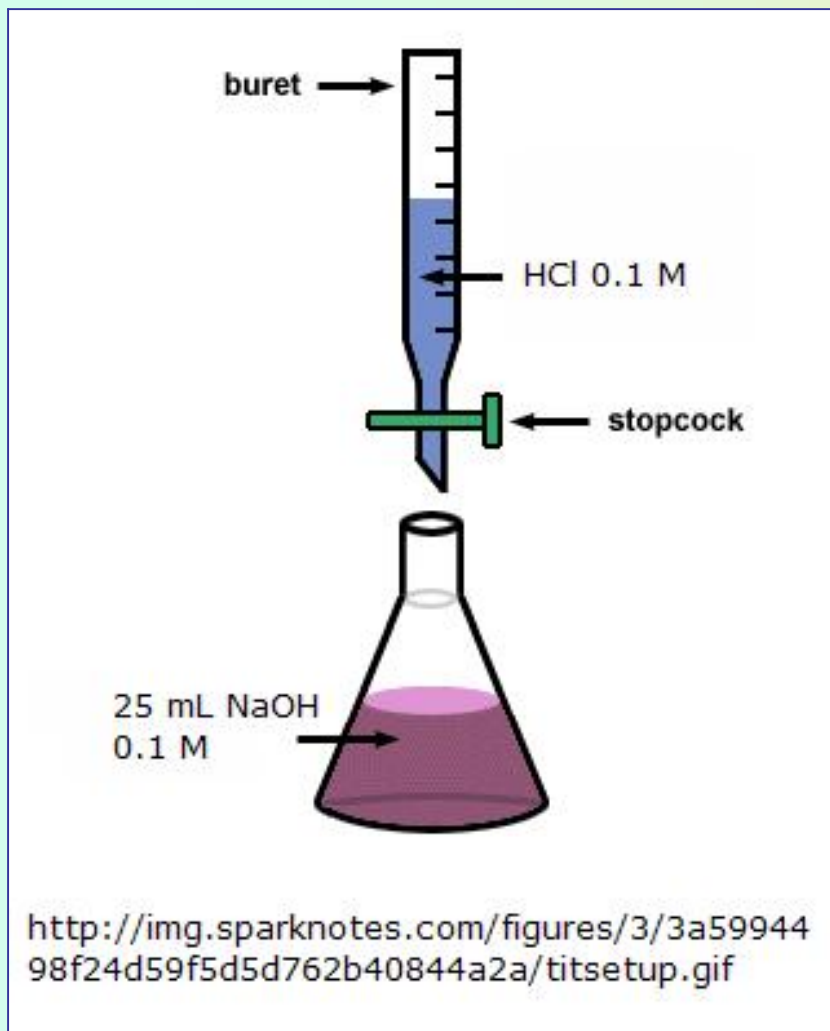
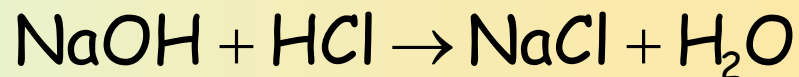


# Balorazioak



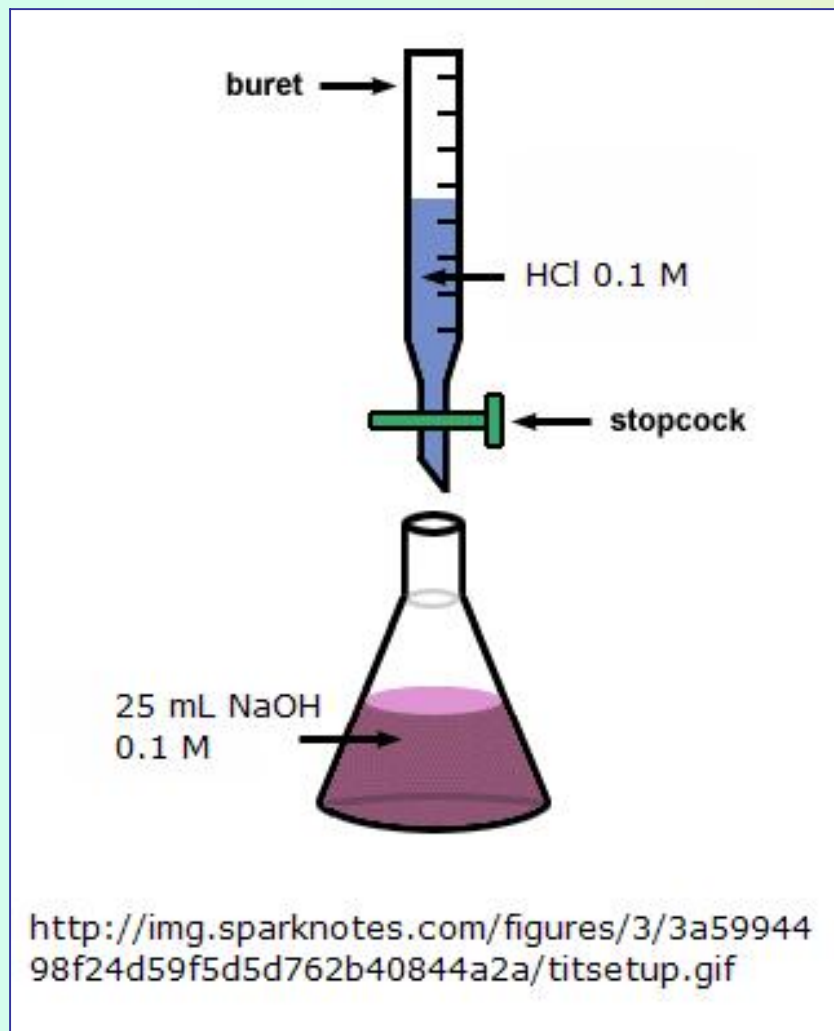
## Sarrera

Eman dezagun azido sendo (HCl) eta base sendo baten (NaOH) arteko balorazioa dugula:



Bureta batekin 0.1 M HCl gehituko duguk, behean 25 mL 0.1 M NaOH ditugu.

# Balorazioak



## Sarrera

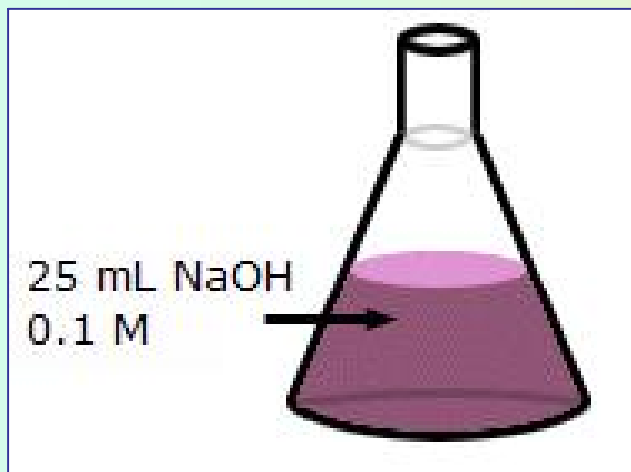
pHa kalkulatu dugu une hauetan

- Azidoa gehitzen hasi aurretik
- Gehiegizko sodio hidroxido dagoenean
- Baliokidetza puntuan
- Gehiegizko azidoa dagoenean

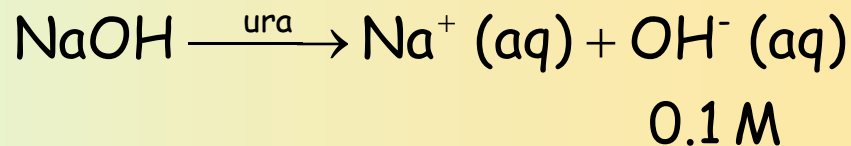
# Balorazioak

## 1. pH azidorik gehitu aurretik

Gure disoluzioaren ezaugarriak hauek dira 25 mL NaOH 0.1 M



pHa bi era hauetan kalkula daitezke:



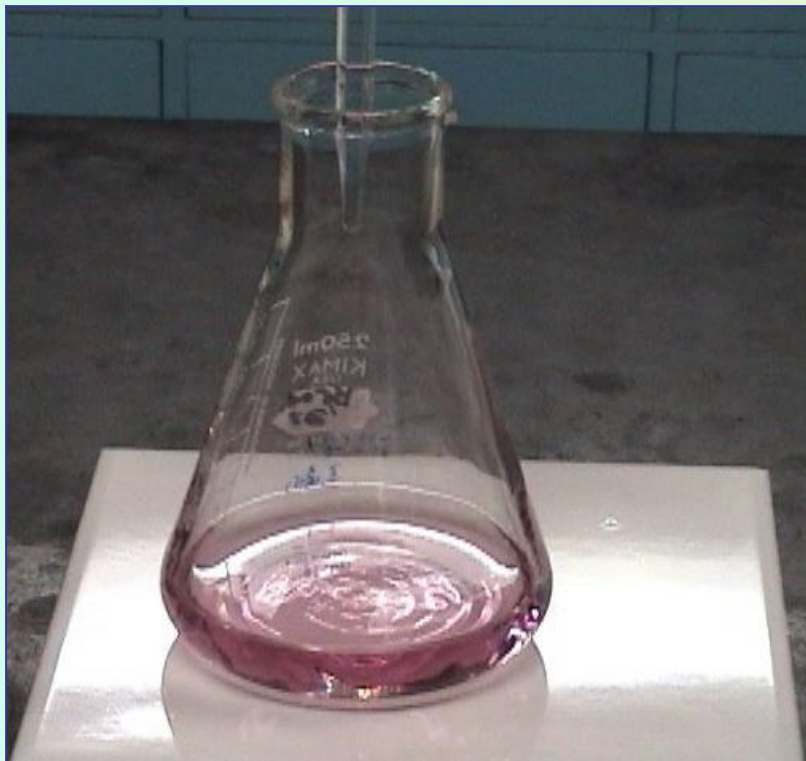
$$\text{pOH} = -\log(0.1) = 1 \rightarrow \text{pH} = 13$$

edo:

$$[\text{H}_3\text{O}^+][\text{OH}^-] = 10^{-14}$$

$$[\text{H}_3\text{O}^+] = \frac{10^{-14}}{[\text{OH}^-]} = 10^{-13} \rightarrow \text{pH} = 13$$

# Balorazioak



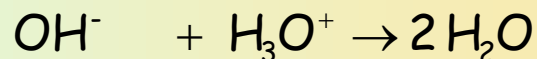
[http://www.chem.ualberta.ca/~iip/chem211irc/Calcium\(start\).jpg](http://www.chem.ualberta.ca/~iip/chem211irc/Calcium(start).jpg)

## 2. pHa gehiegizko NaOH disoluzioa dagoenean

Eman dezagun 10 mL HCl disoluzio gehitu direla hasierako 25 mL NaOH 0.1 M disoluzioari

Ioiien mol-kopuruak hauek dira:

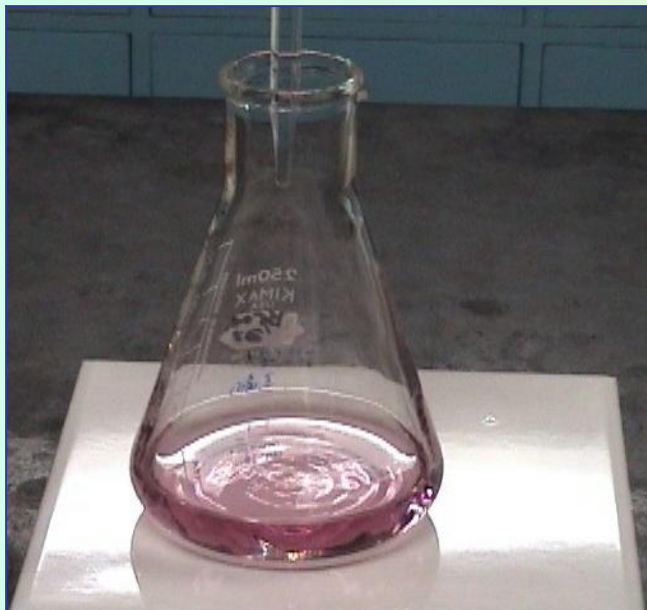
NaOH - tik      HCl - tik



0.0025 mol      0.001 mol

$$n(\text{OH}^-) = 0.025 \text{ L} * 0.1 \frac{\text{mol}}{\text{L}} = 2.5 * 10^{-3} \text{ mol}$$

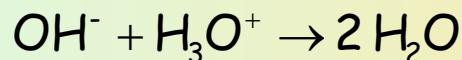
$$n(\text{H}_3\text{O}^+) = 0.010 \text{ L} * 0.1 \frac{\text{mol}}{\text{L}} = 1 * 10^{-3} \text{ mol}$$



[http://www.chem.ualberta.ca/~iip/chem211irc/Calcium\(start\).jpg](http://www.chem.ualberta.ca/~iip/chem211irc/Calcium(start).jpg)

## 2. pHa gehiegizko NaOH disoluzioa dagoenean

Hidroxidotik geratzen diren mol-kopuruak eta pHa neutralizazio partziala gertatu eta gero:



$$n(\text{OH}^-) = 0.0025 \text{ mol} - 0.001 \text{ mol} = 0.0015 \text{ mol OH}^-$$

$$[\text{OH}^-] = \frac{0.0015 \text{ mol}}{0.025 \text{ L} + 0.010 \text{ L}} = 0.043 \text{ M}$$

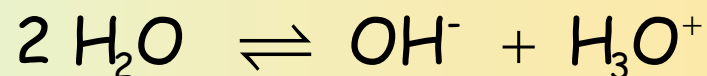
$$\text{pOH} = 1.37 \rightarrow \text{pH} = 12.63$$

Emandako urratsak :

1. Geratzen diren mol-kopuruak kalkulatu
2. Kontzentrazioa kalkulatu (bolumenak gehitu)

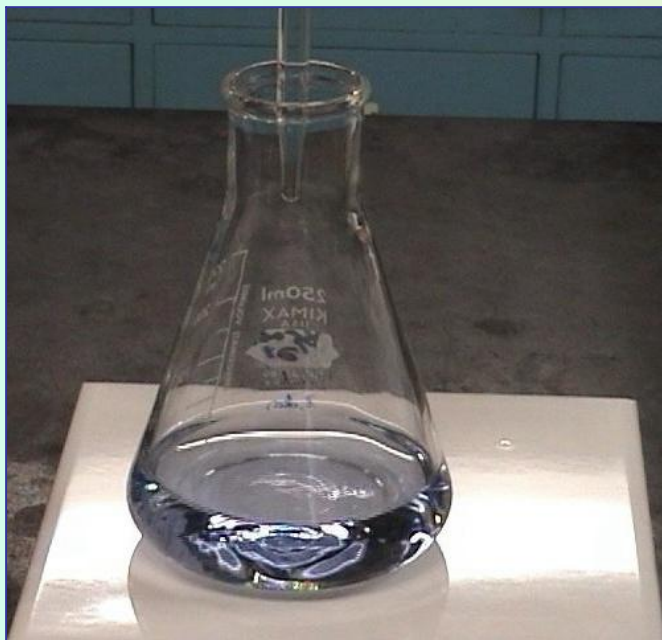
## 3. pHa baliokidetza-puntuan

Ioi guztiak neutralizatu dira eta geratzen diren ioi bakarrak uraren autoionizaziotik sortzen direnak dira:



$$[\text{OH}^-] = [\text{H}_3\text{O}^+] = 10^{-7}$$

$$\text{pH} = \text{pOH} = 7$$



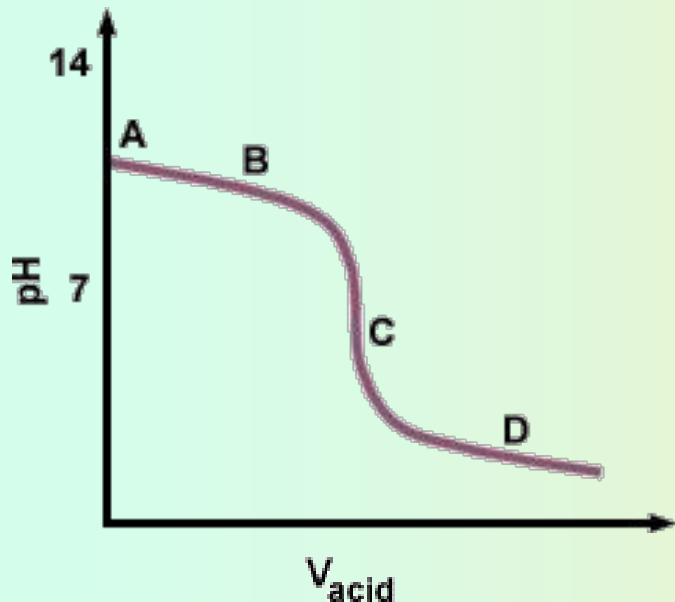
[http://www.chem.ualberta.ca/~iip/chem211irc/Calcium\(end\).jpg](http://www.chem.ualberta.ca/~iip/chem211irc/Calcium(end).jpg)

# Balorazioak

## 4. pH azido gehiegizko disoluzioan

Eman dezagun 26 mL azido gehitu direla.

Hidronioen kontzentrazioa eta pHa kalkulatu ditugu:



$$n(\text{OH}^-) = 0.025 \text{ L} * 0.1 \frac{\text{mol}}{\text{L}} = 2.5 * 10^{-3} \text{ mol}$$

$$n(\text{H}_3\text{O}^+) = 0.026 \text{ L} * 0.1 \frac{\text{mol}}{\text{L}} = 2.6 * 10^{-3} \text{ mol}$$

$$n(\text{H}_3\text{O}^+ \text{ gehiegizkoa}) = 0.0001 \text{ mol} = 10^{-4} \text{ mol}$$

$$[\text{H}_3\text{O}^+] = \frac{10^{-4} \text{ mol}}{0.051 \text{ L}} = 0.00196 \text{ M} \rightarrow \text{pH} = 2.71$$