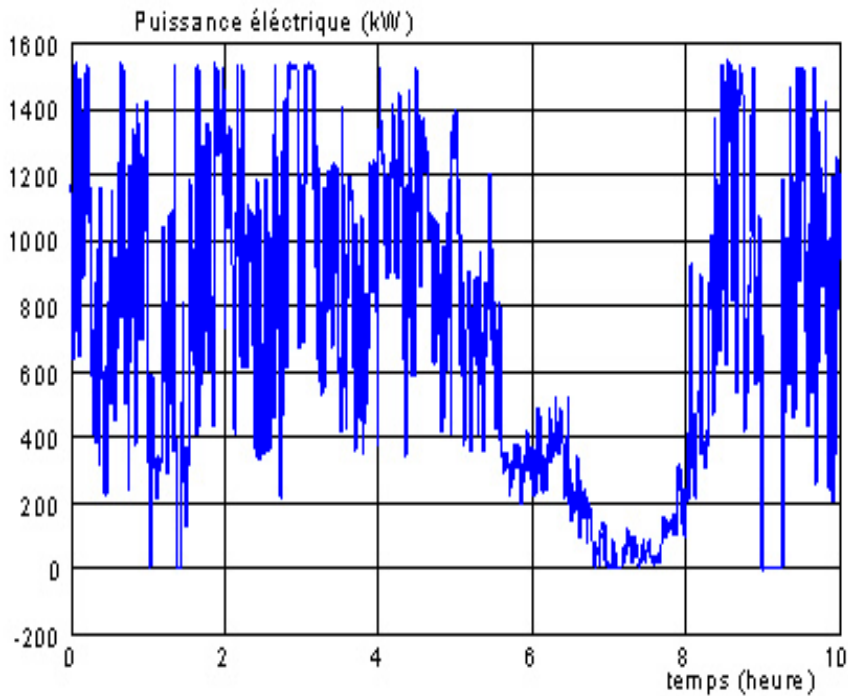


Conversion réciproque d'énergie électrique en énergie chimique.

Agrégation 2020

Stockage de l'énergie ?

Figure 1. Puissance électrique générée par une éolienne de 1,5 MW sur 10h

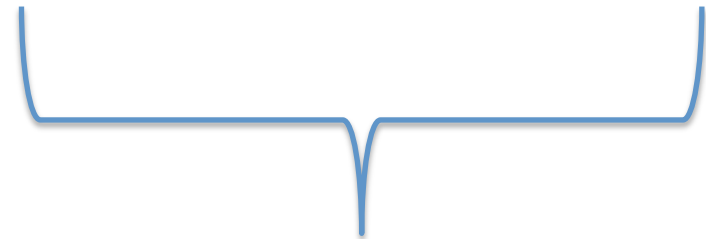


Source : Laborelec

**Energies renouvelables
Production non régulière**



**Energie chimique comme moyen de
stocker de l'énergie**

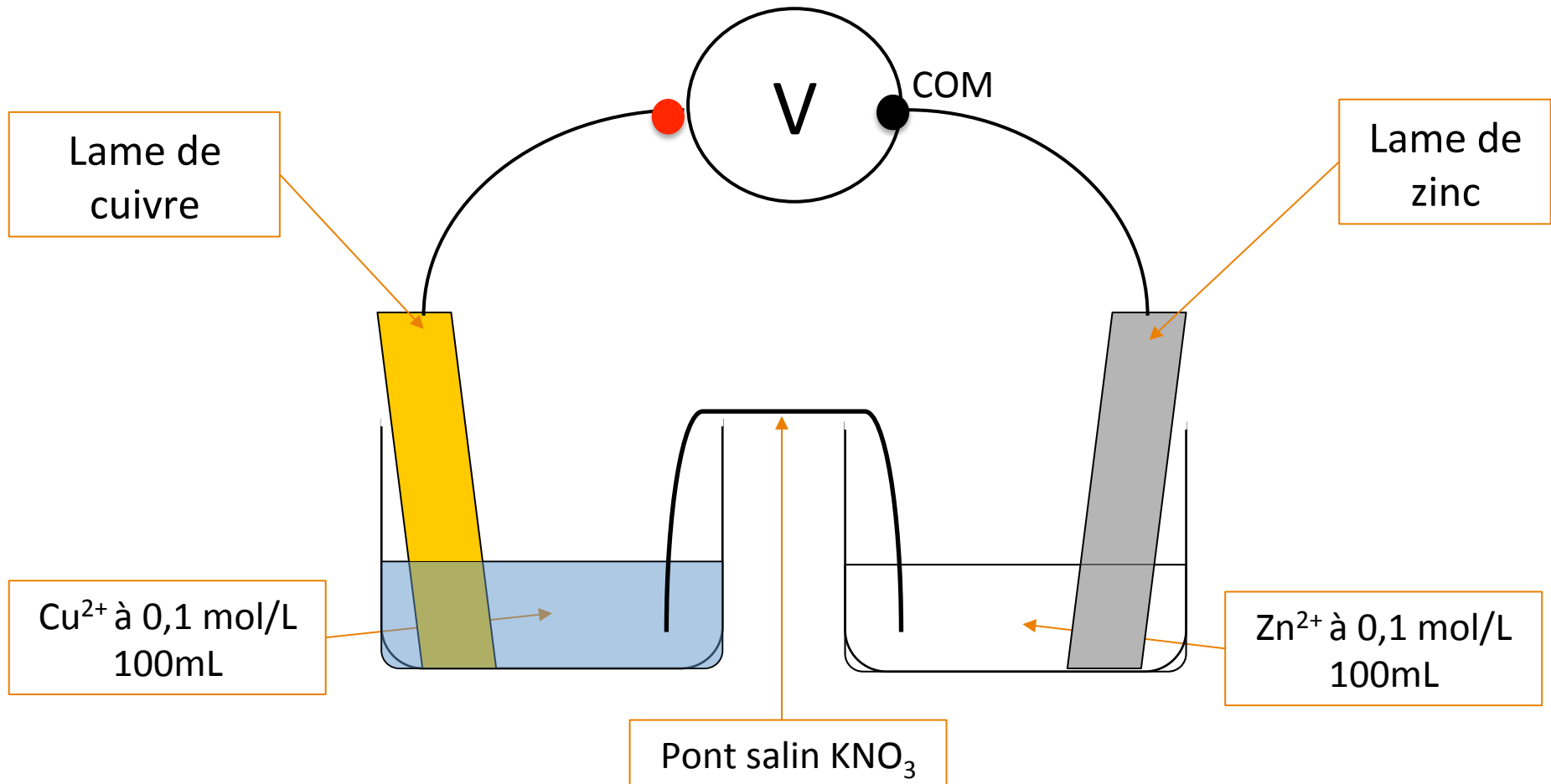


Energie chimique



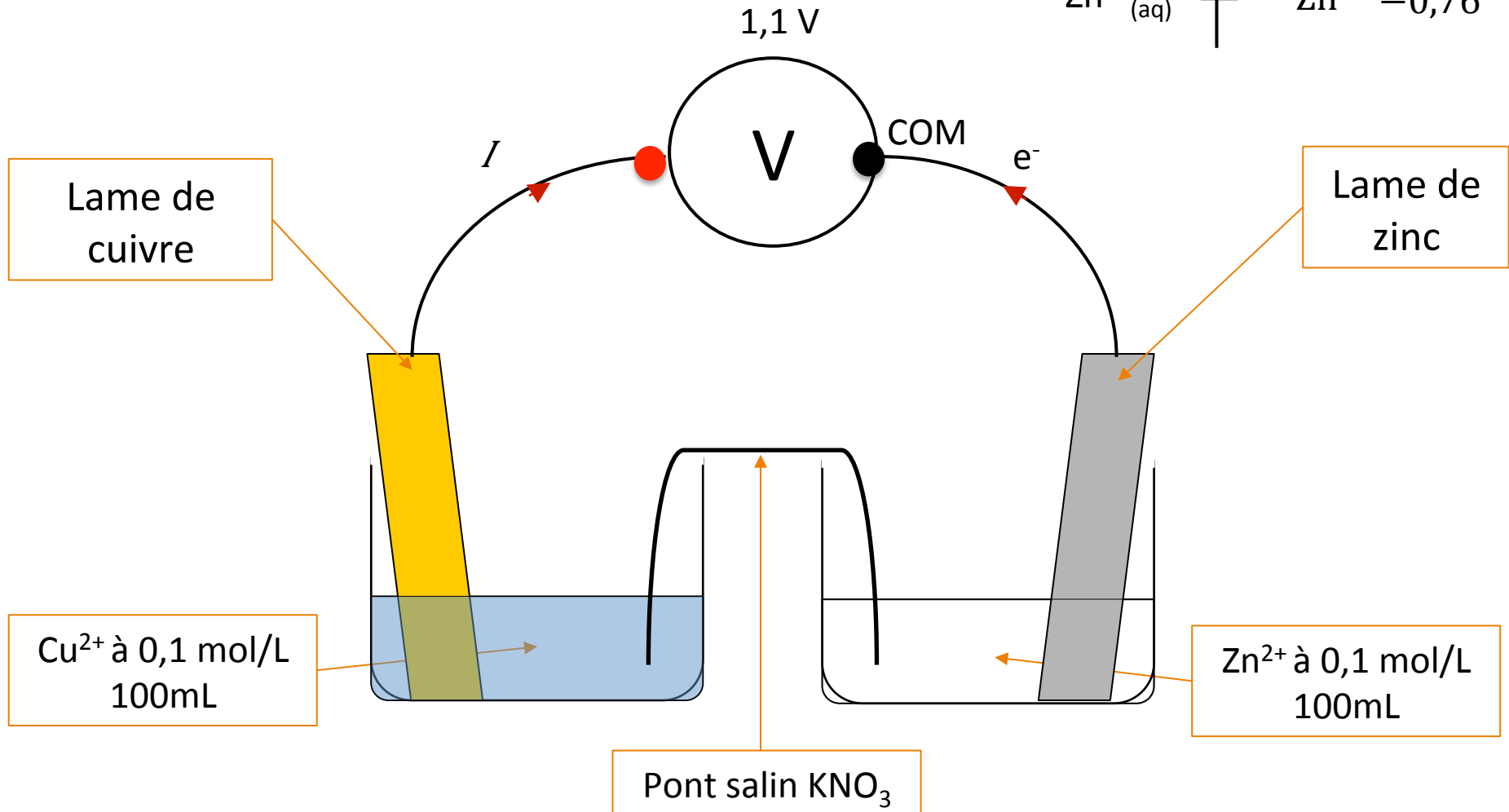
Energie électrique

Pile Daniell

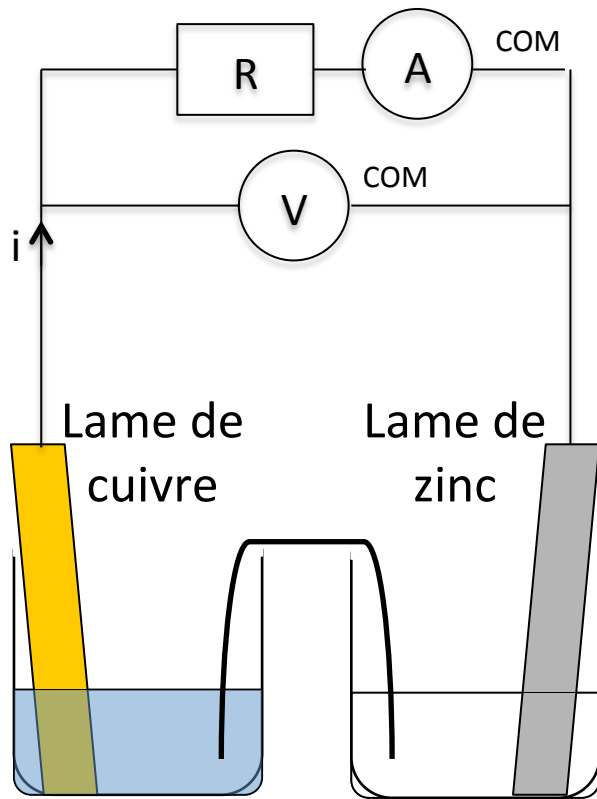


Pile Daniell

	$E^\circ(\text{V})$		
$\text{Cu}^{2+}_{(\text{aq})}$	\uparrow	Cu	0,34
$\text{Zn}^{2+}_{(\text{aq})}$	\downarrow	Zn	-0,76

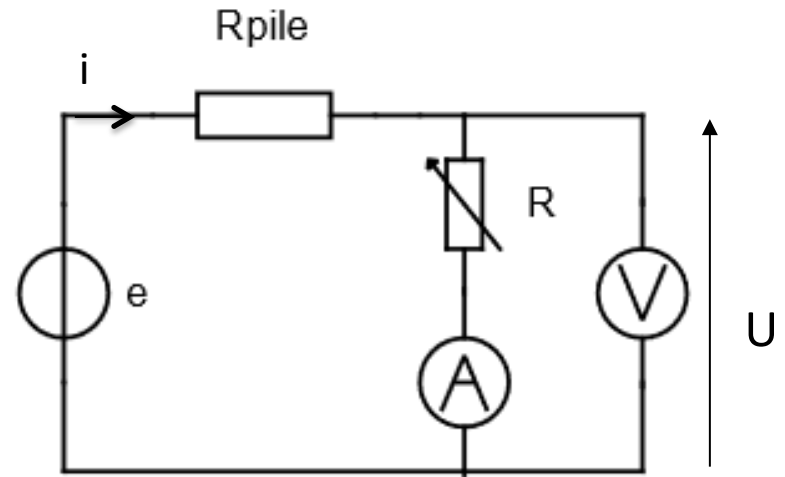


Mesure de la résistance interne



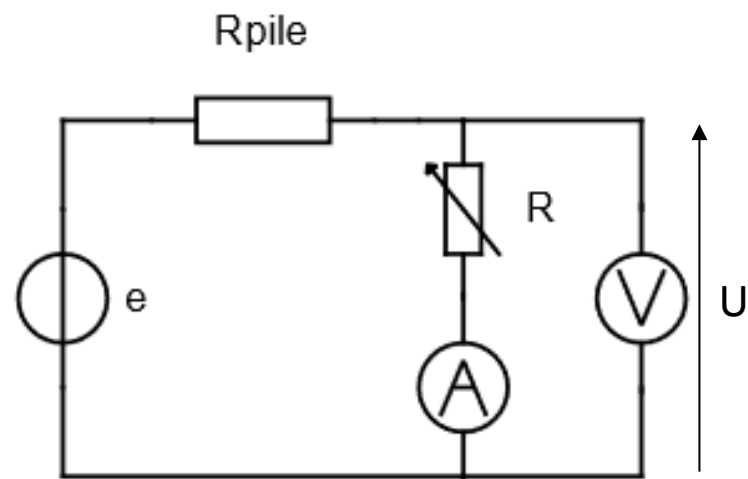
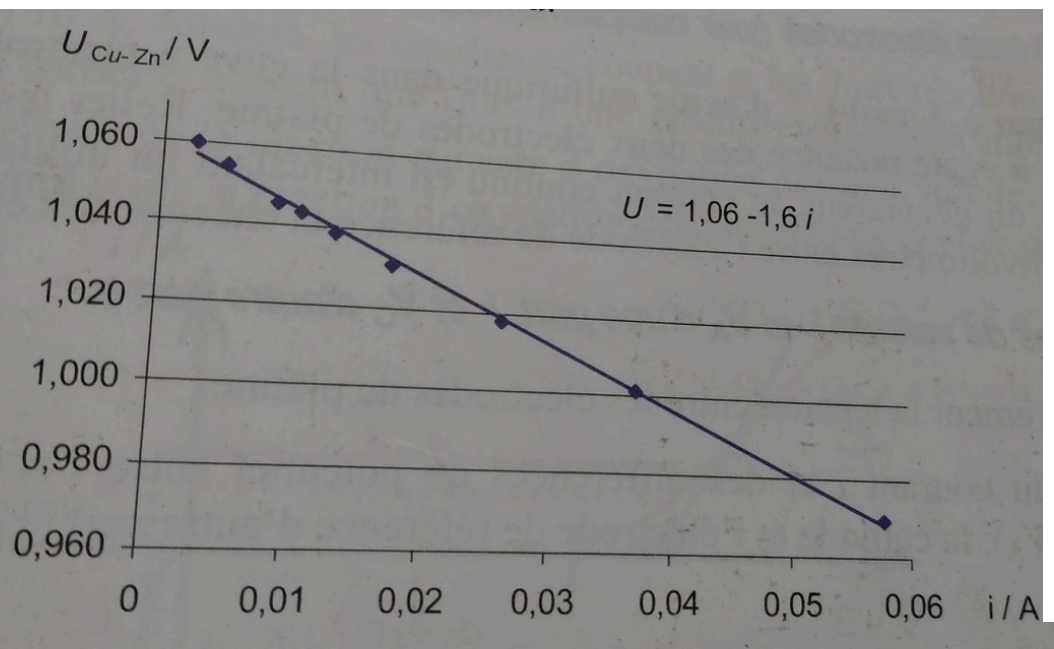
Cu^{2+} à 0,1 mol/L

Zn^{2+} à 0,1 mol/L



$$U = e - r_{\text{pile}} i$$

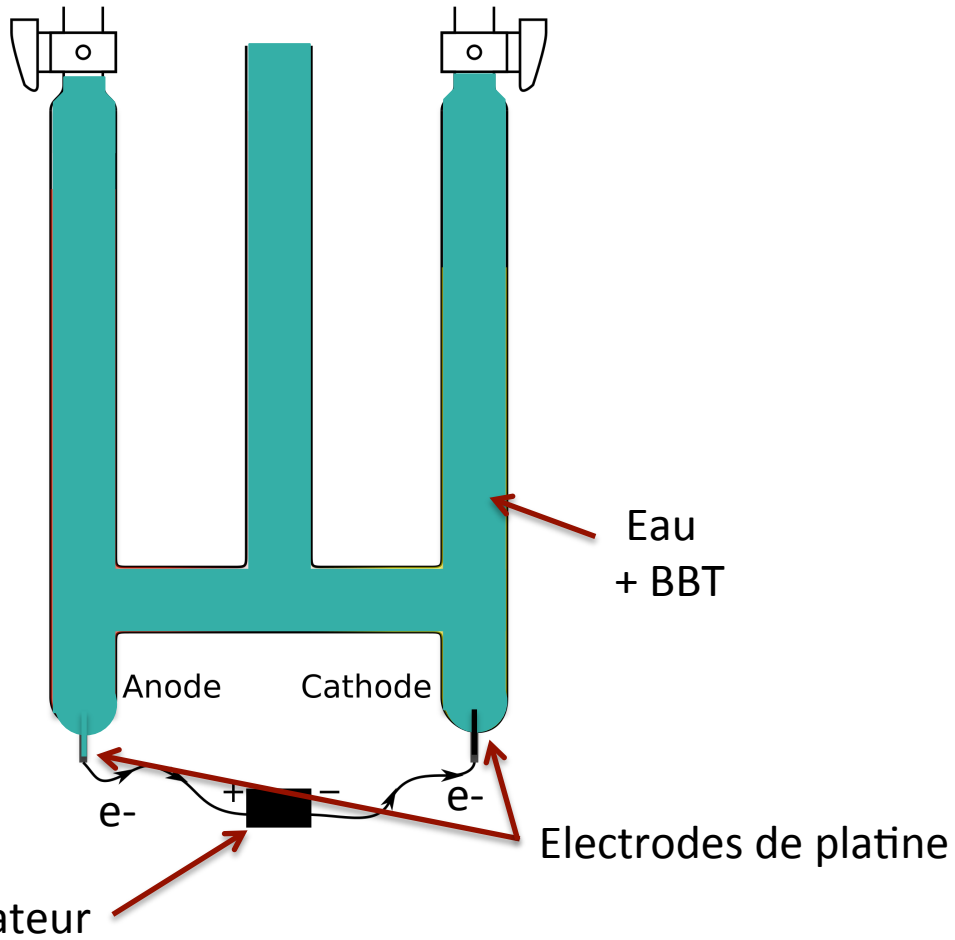
Résultats expérimentaux



$$U = e - r_{\text{pile}} i$$

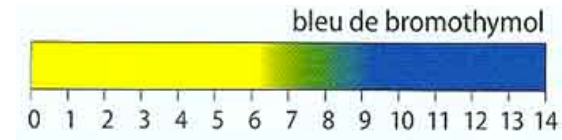
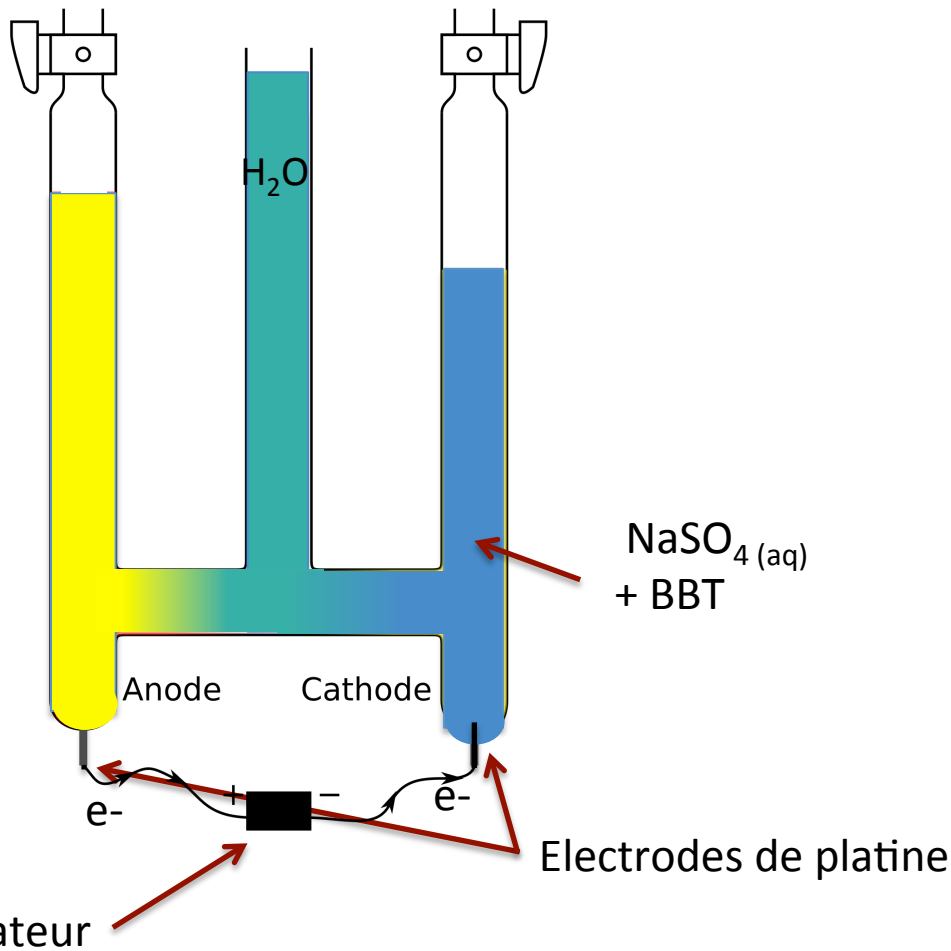
Electrolyse de l'eau

Electrolyseur Hoffman



Electrolyse de l'eau

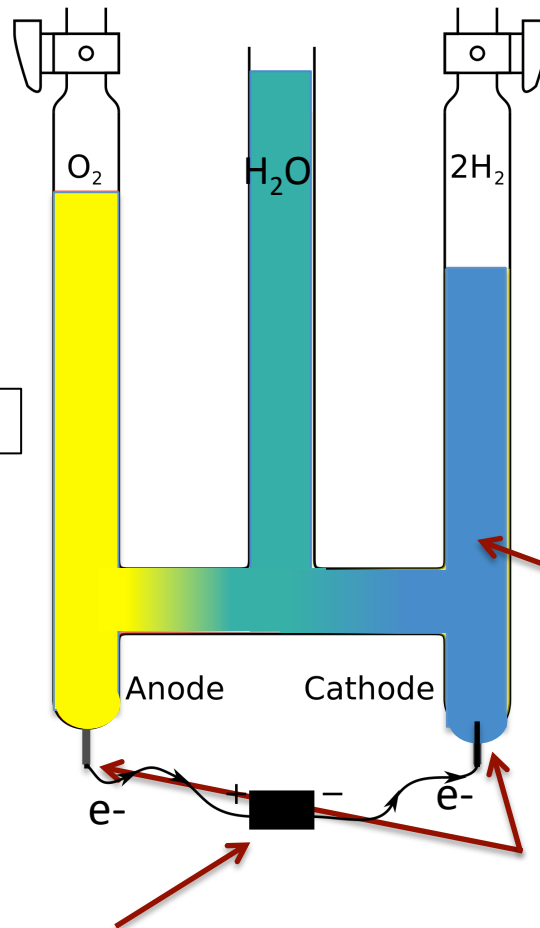
Electrolyseur Hoffman



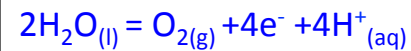
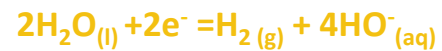
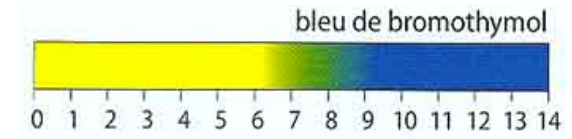
Couleur du BBT en fonction du pH

Electrolyse de l'eau

Electrolyseur Hoffman



Couleur du BBT en fonction du pH

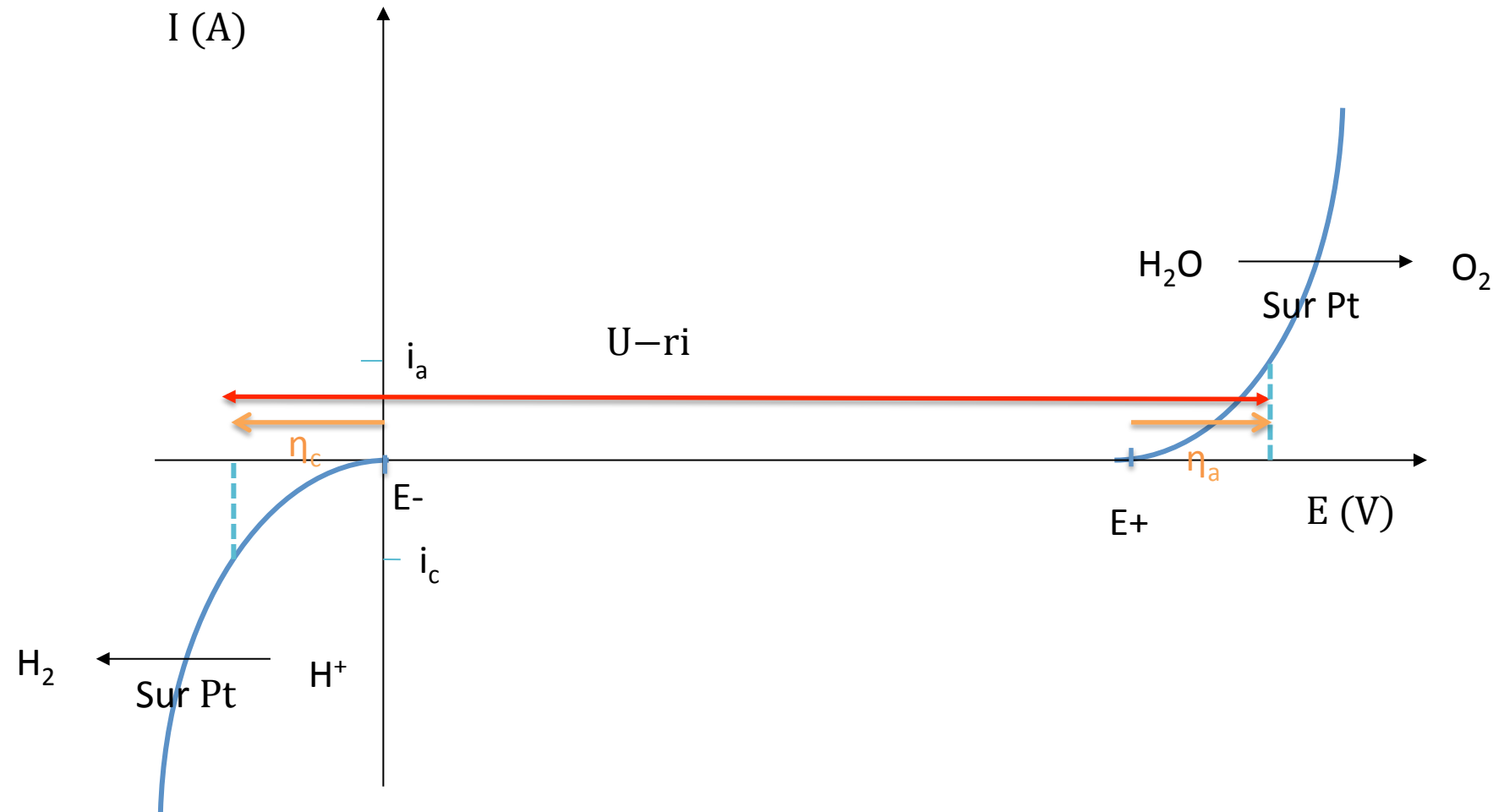


$NaSO_4(aq)$
+ BBT

Electrodes de platine

Générateur

Électrolyse de l'eau



Pile à combustible

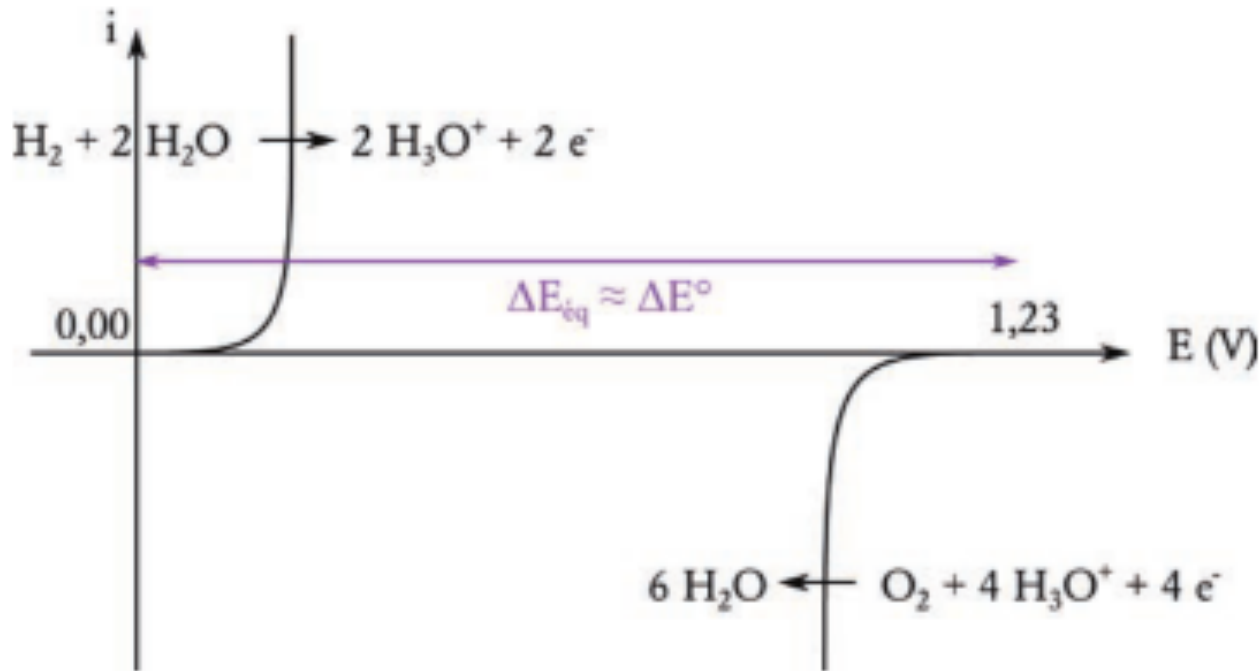
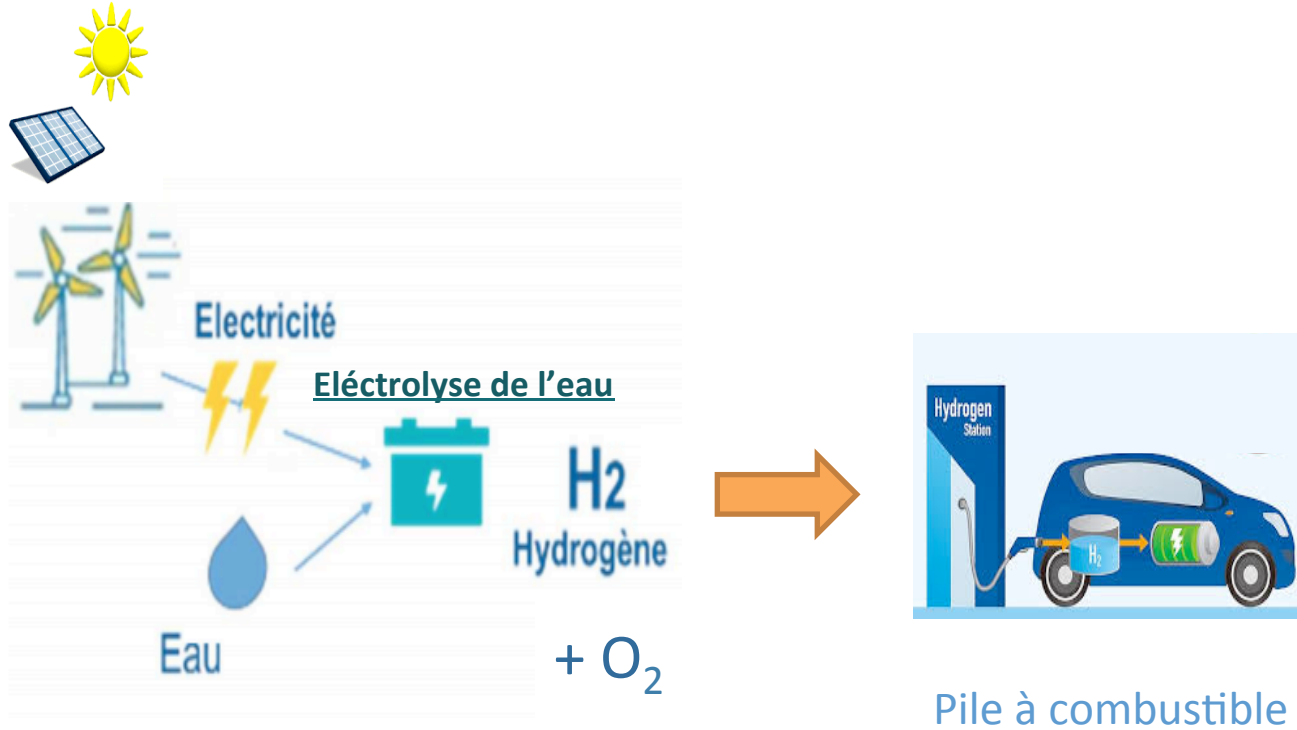
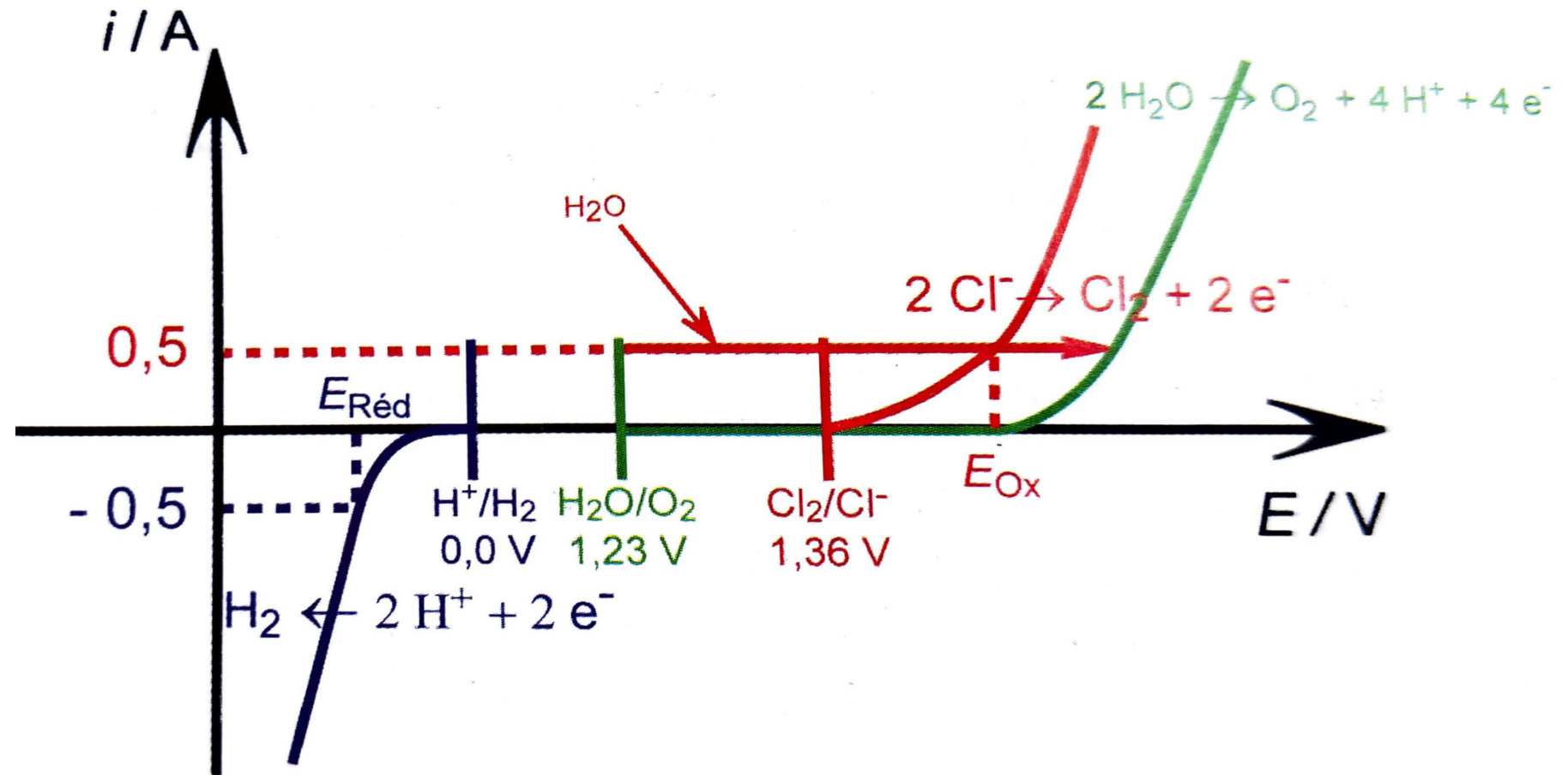


Figure 7.15 : Courbes intensité-potentiel pour la pile à combustible

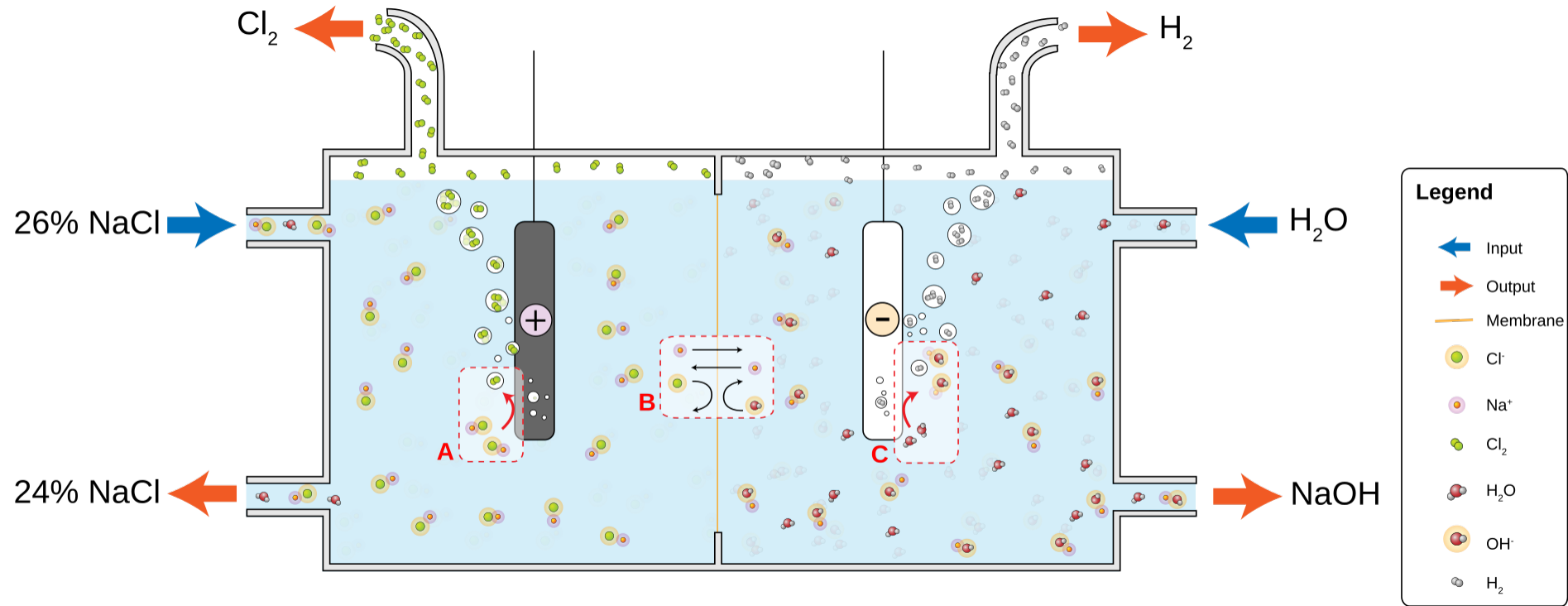
Conversion réciproque d'énergie électrique en énergie chimique



Synthèse chlore-soude



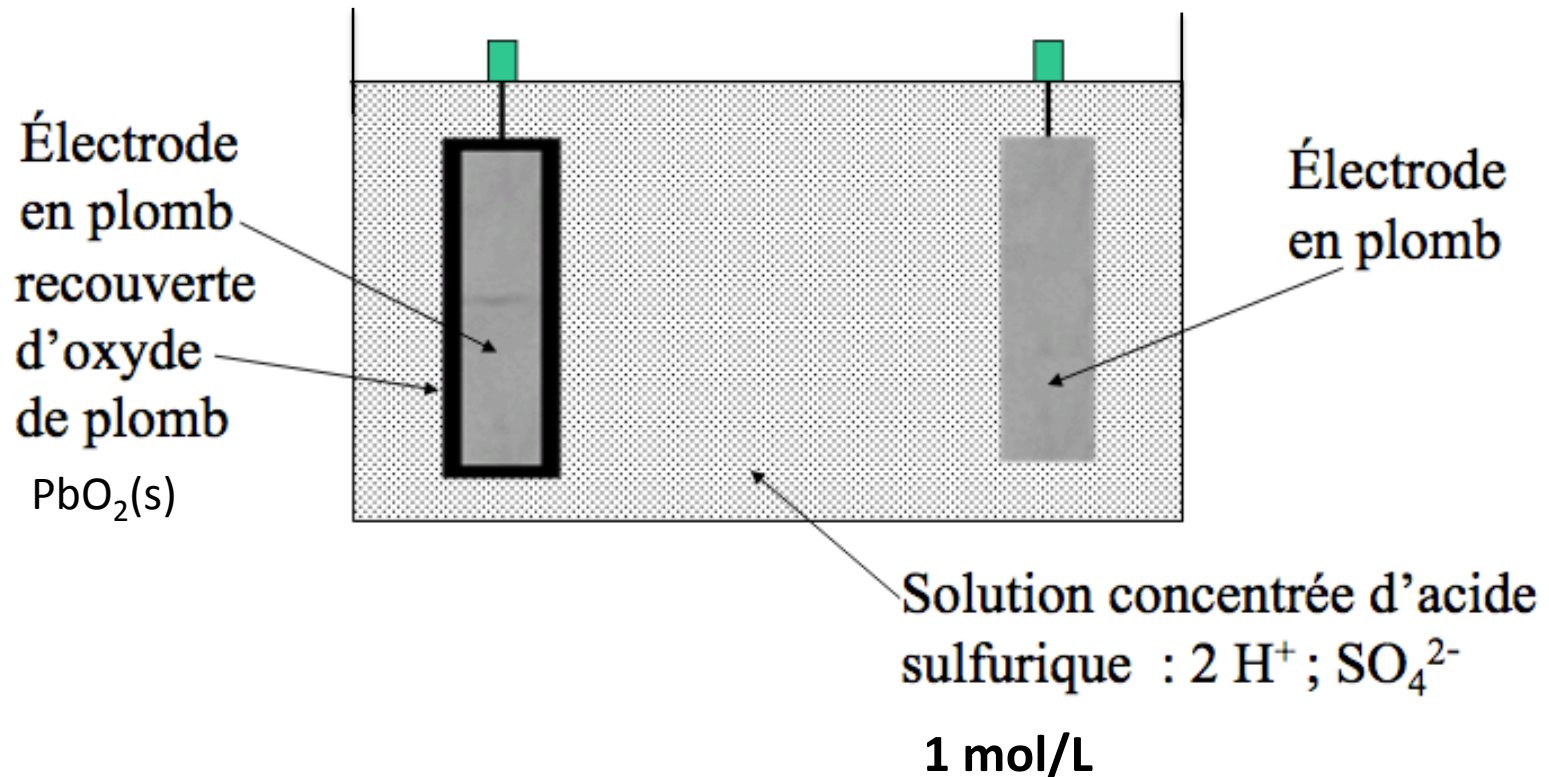
Synthèse chlore-soude



Présentation de l'accumulateur au Plomb chargé

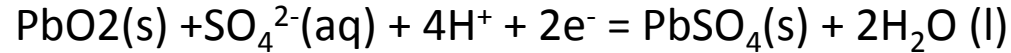
$$E^\circ(\text{PbO}_{2(s)}/\text{PbSO}_{4(s)}) = 1,69$$

$$E^\circ(\text{PbSO}_{4(s)}/\text{Pb}_{(s)}) = -0,36$$



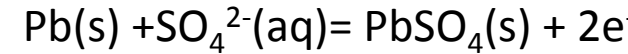
Décharge de l'accumulateur au plomb

Réduction

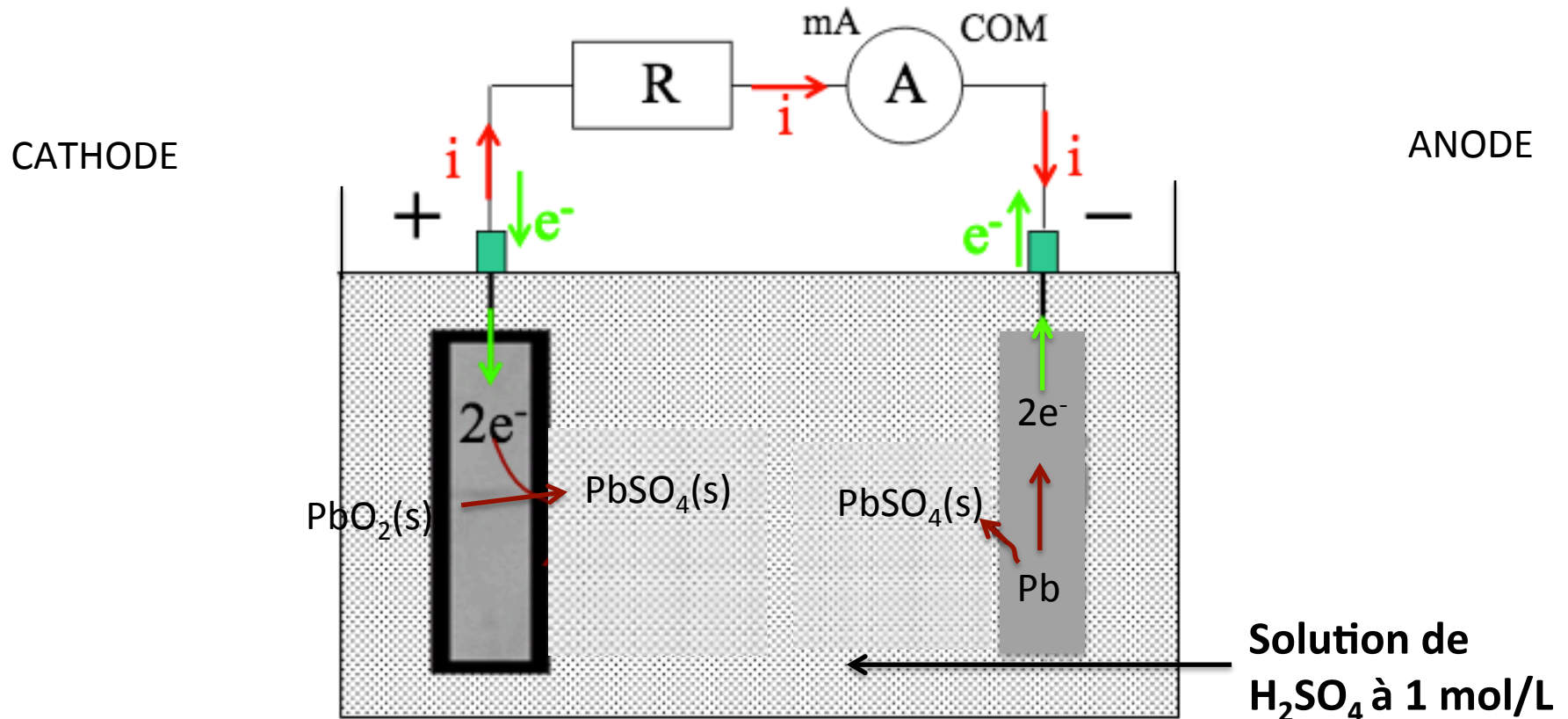


$$E(\text{PbO}_2/\text{PbSO}_4) = 1,72 \text{ V}$$

Oxydation



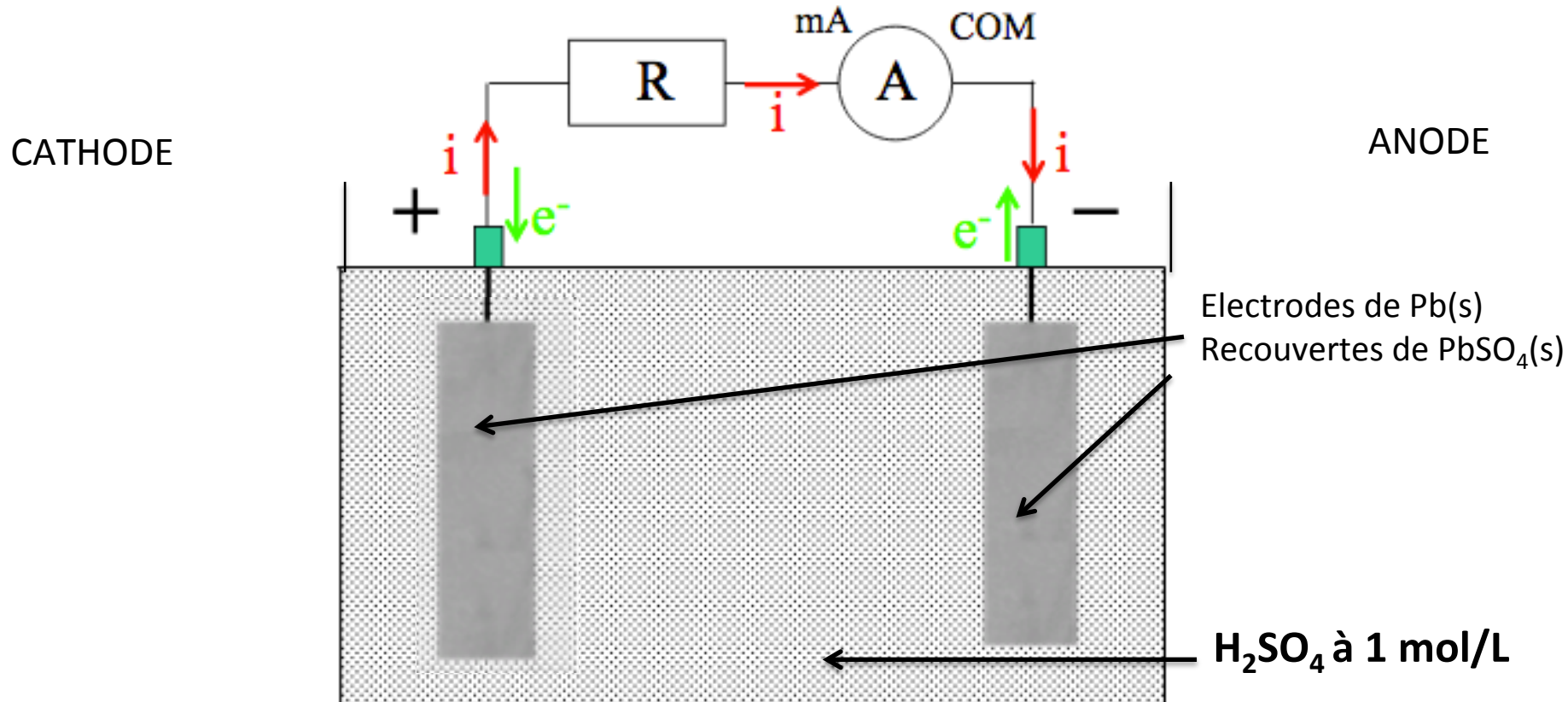
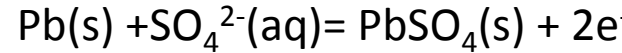
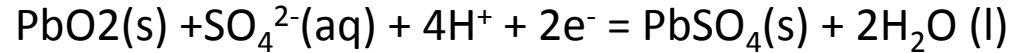
$$E(\text{PbSO}_4/\text{Pb}) = -0,36 \text{ V}$$



Accumulateur au plomb déchargé

Réduction

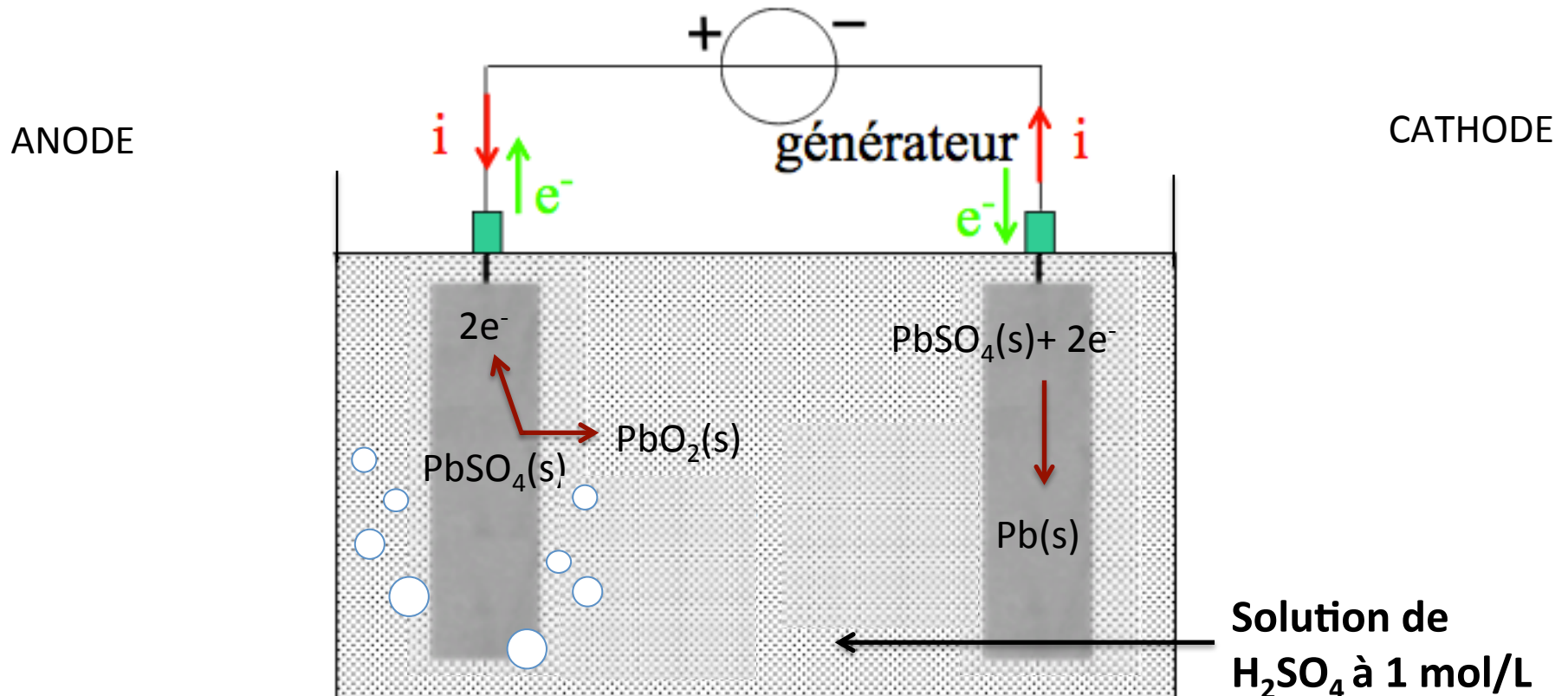
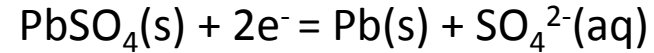
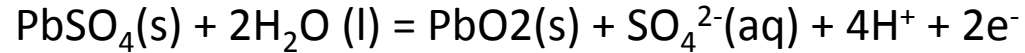
Oxydation



Charge de l'accumulateur au plomb

Oxydation

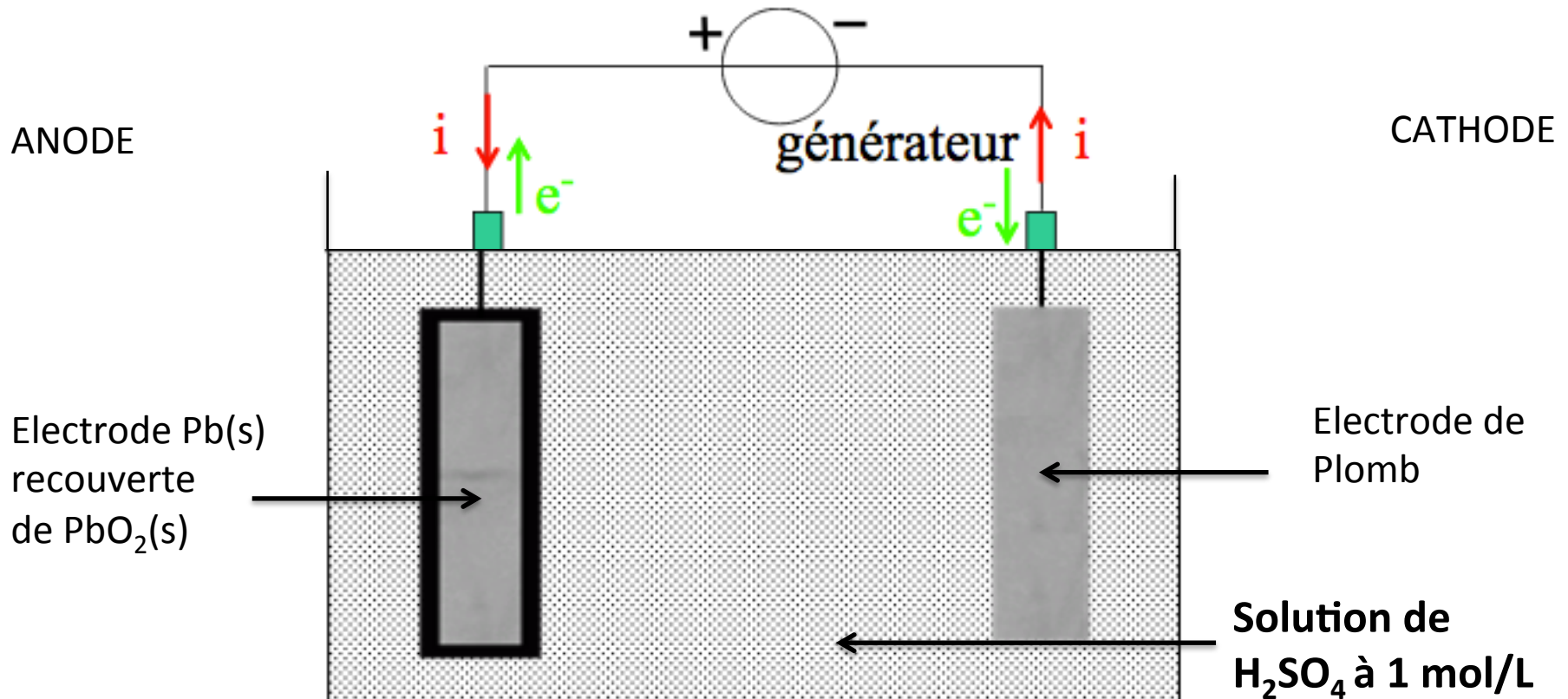
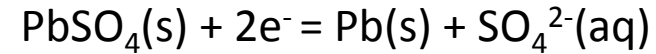
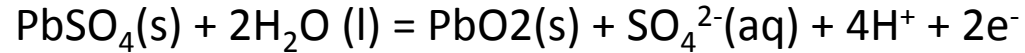
Réduction



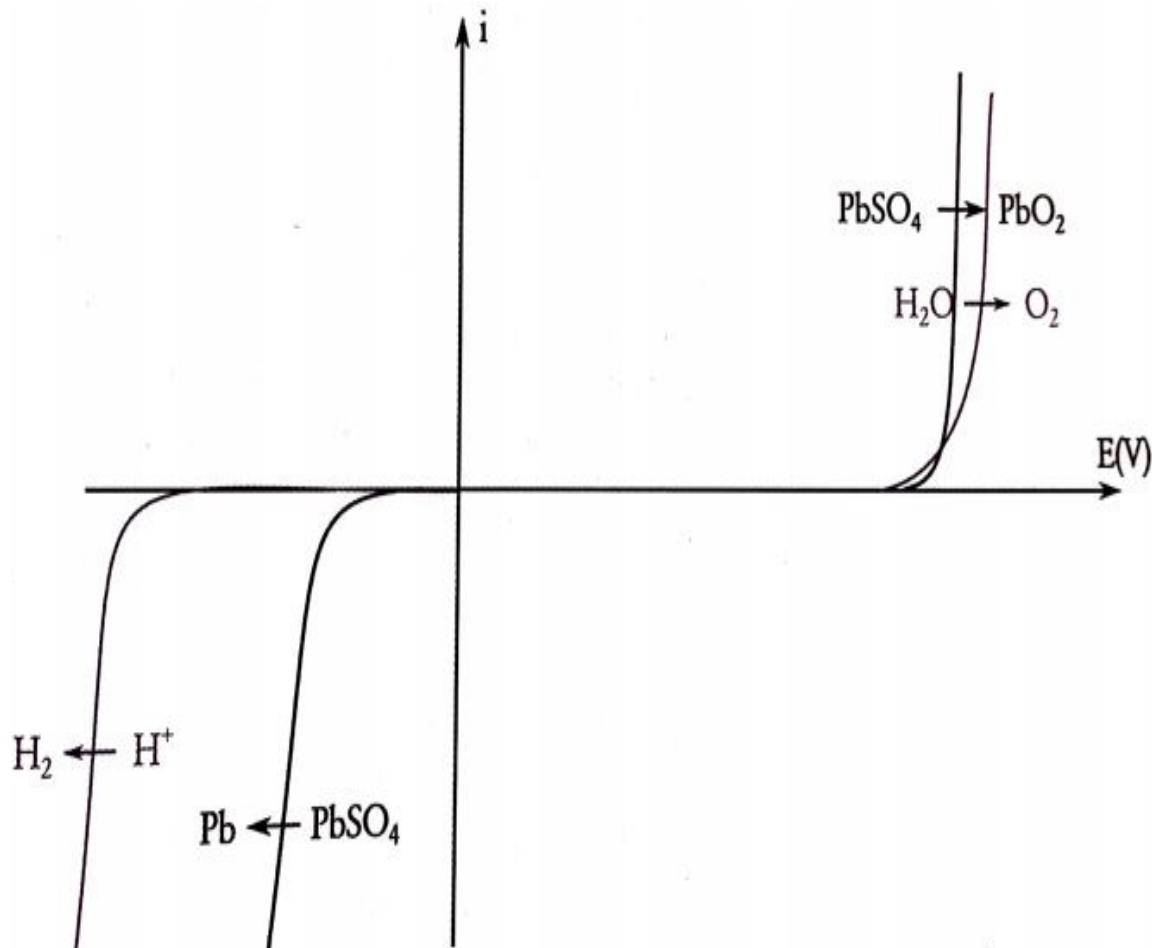
Accumulateur au plomb chargé

Oxydation

Réduction



Recharge d'un accumulateur au plomb



Accumulateur au Plomb

Énergie massique	Puissance massique	Force électromotrice	Cyclabilité	Rendement faradique
27 Wh.kg ⁻¹	250 W.kg ⁻¹	2,0 V	1000	< 1