

# Chapter 01: Electrochemical Kinetics

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## 1 Introduction

The thermodynamic study of an electrochemical system is insufficient to study the principal phenomena (it only tells us whether a transformation is possible or spontaneous). The study of the reaction rate provides complementary elements.

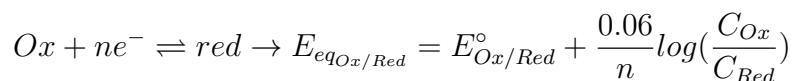
## 2 Overpotential and polarization curve

### 2.1 Overpotential

If an electrode is crossed by a current  $I$ , (because of a polarization: put a potential). It takes a potential  $E$   $E \neq E_{eq}$ . So, the overpotential  $\mu : \mu = E - E_{eq}$

#### Reminder:

what's  $E_{eq}$ ,  $E_{eq}$  = Equilibrium potential given by Nernst formula: For Redox reaction:



$E_{eq}$  corresponds to the potential when  $I = 0$

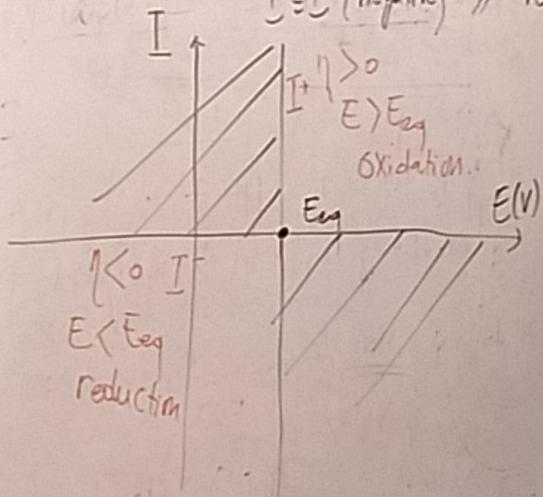
The electrochemical reaction takes place in the direction where  $\Delta G < 0$ , So we have always  $\mu \cdot I \geq 0$

By convention,  $I = I^+$  (Positive) for oxidation

$I = I^-$  (negative) for reduction

Let's see ( $I = f(E)$ ) ,  $E(v) \neq U$  ( $E(v)$  is potential,  $U$  is ddp (difference de potential))

By convention,  $I = I^+$  (positive) for oxidation  
 $I = I^-$  (negative) // reduction.



let's see

$$I = f(E)$$

$$E(V)$$

$$I = f(E)$$

$$E(V)$$