

Zimmer & Peacock

eSensor Manufacturing and Technology

Potentiometric Sensors

2017



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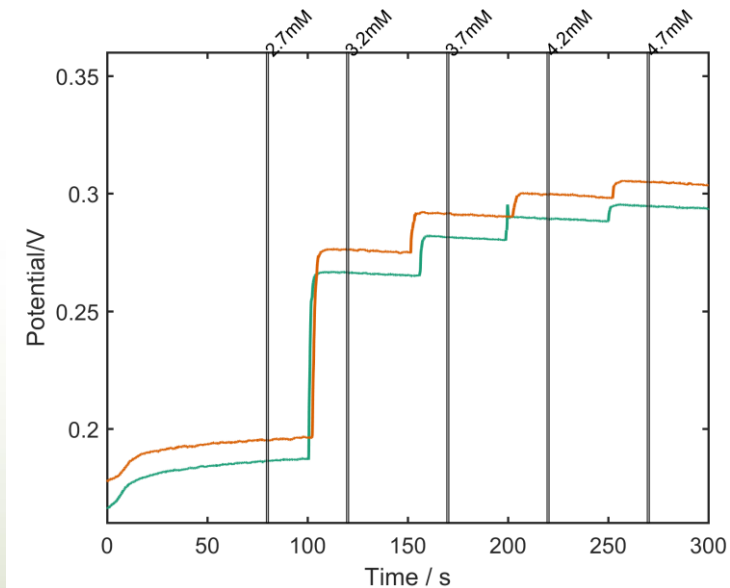
Potassium, Sodium, pH,
Ammonium etc.

Ion-selective electrodes

Electrochemical detection of glucose

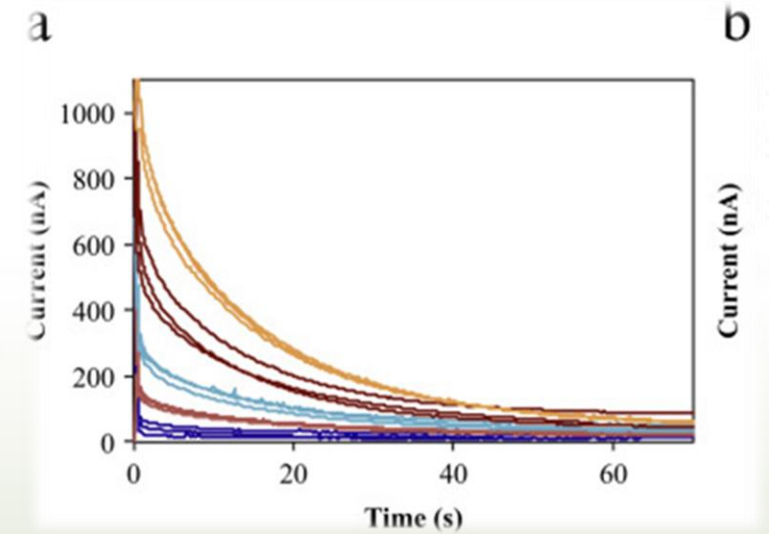
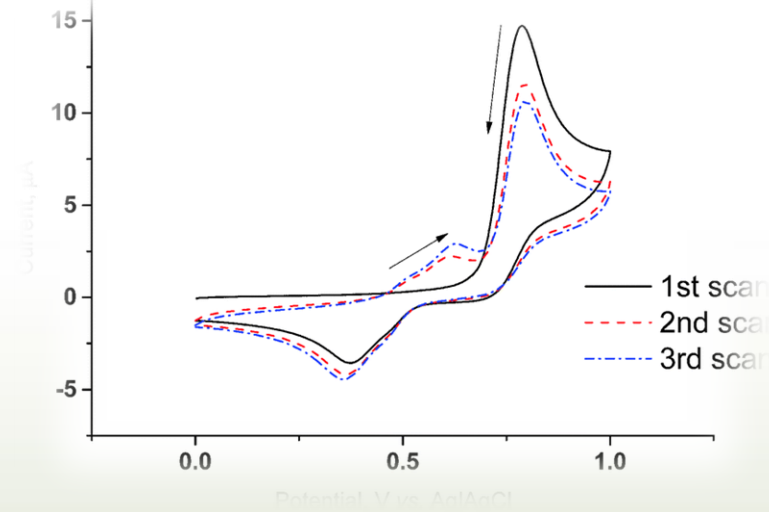
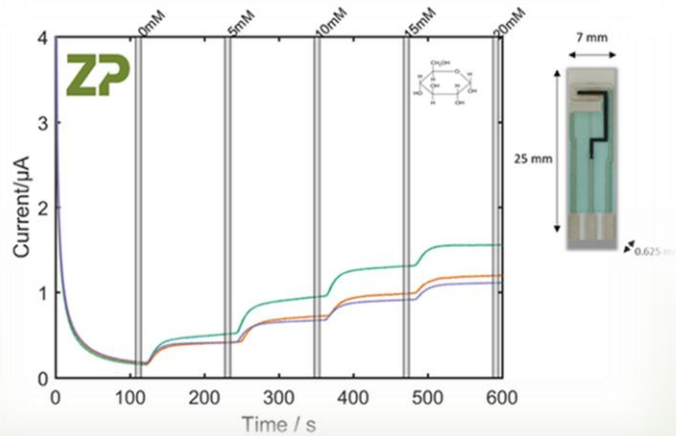


- Description



Potentiometric versus current methods

- Amperometric and cyclic voltammetry analysis



Potentiometric Equation

R is the gas constant
(8.3143 Joules \times K⁻¹ \times mol⁻¹)

T is the absolute temperature in
Kelvin (i.e. 37°C = 310° K)

$$E_{sample} = E_0 + \left(\frac{2.3RT}{nF} \right) \times \log a_{ion}$$

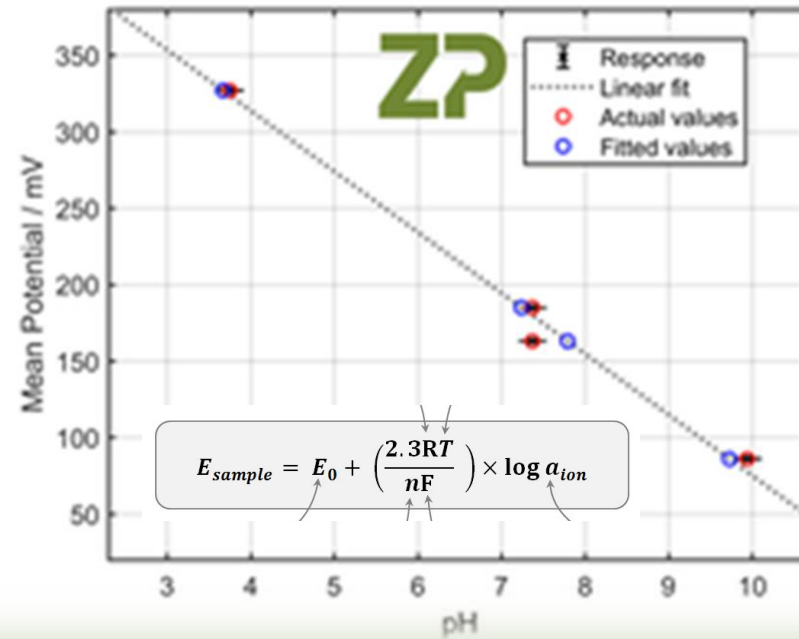
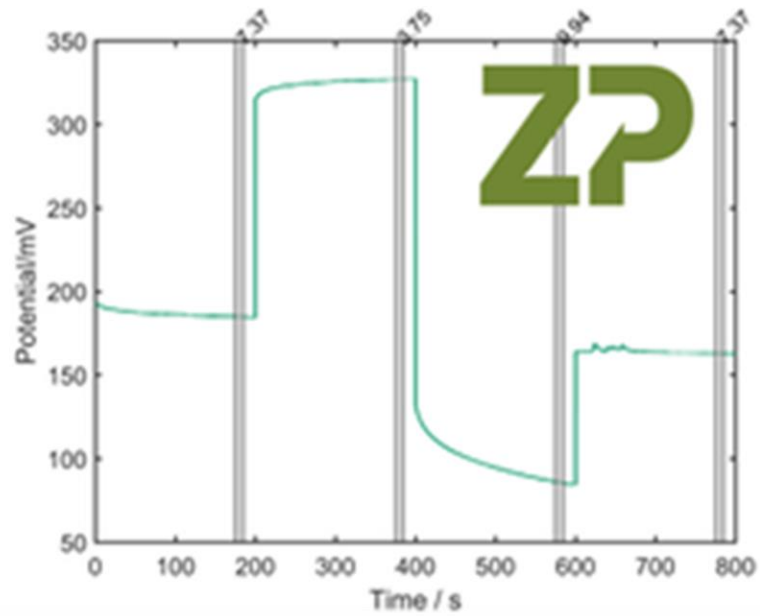
E_0 is the known, stable potential of the
reference electrode

a_{ion} is the activity of the specific ion

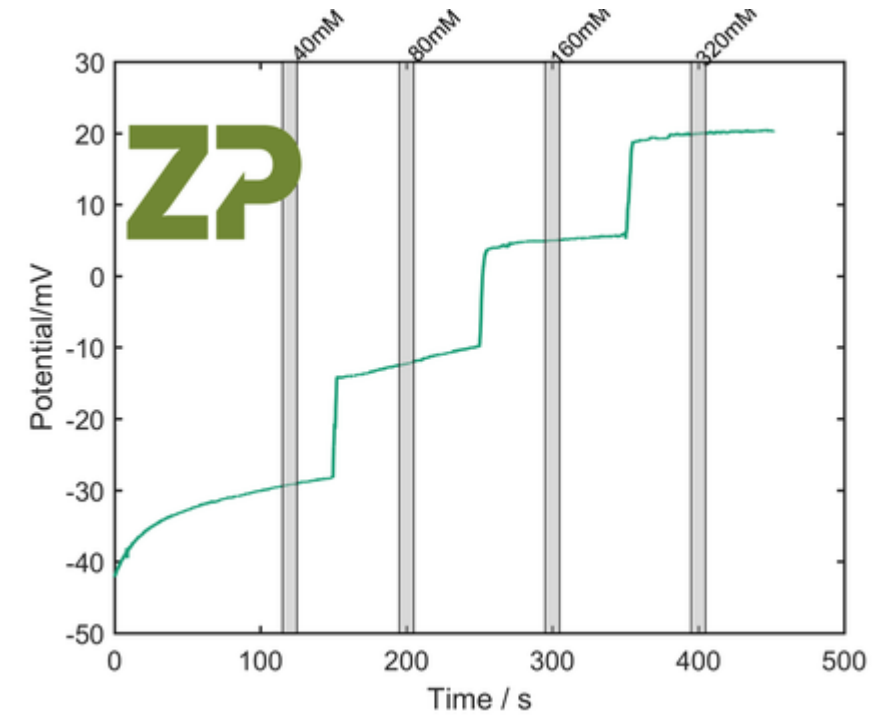
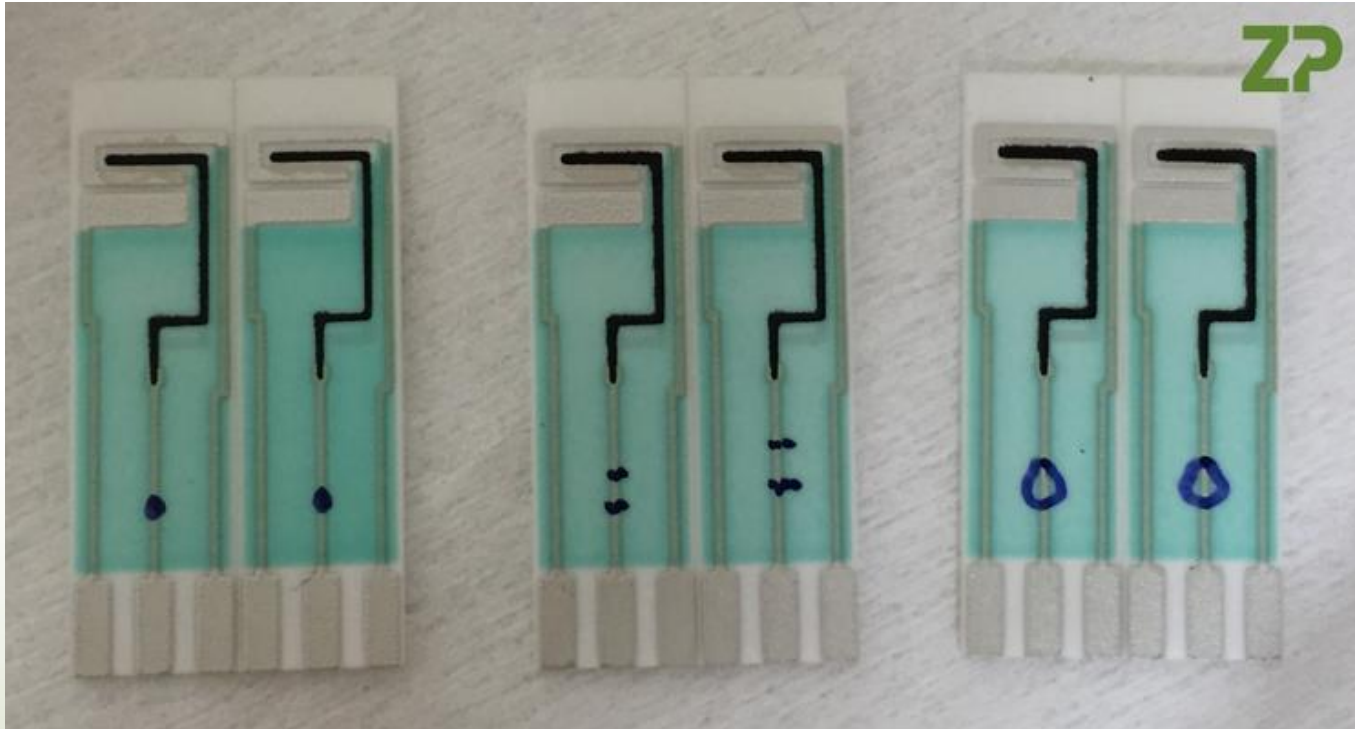
n is the charge of the measured ion
(i.e. the charge of K⁺ is +1)

F is the Faraday constant, which is
96487 coulombs per mole

pH sensor



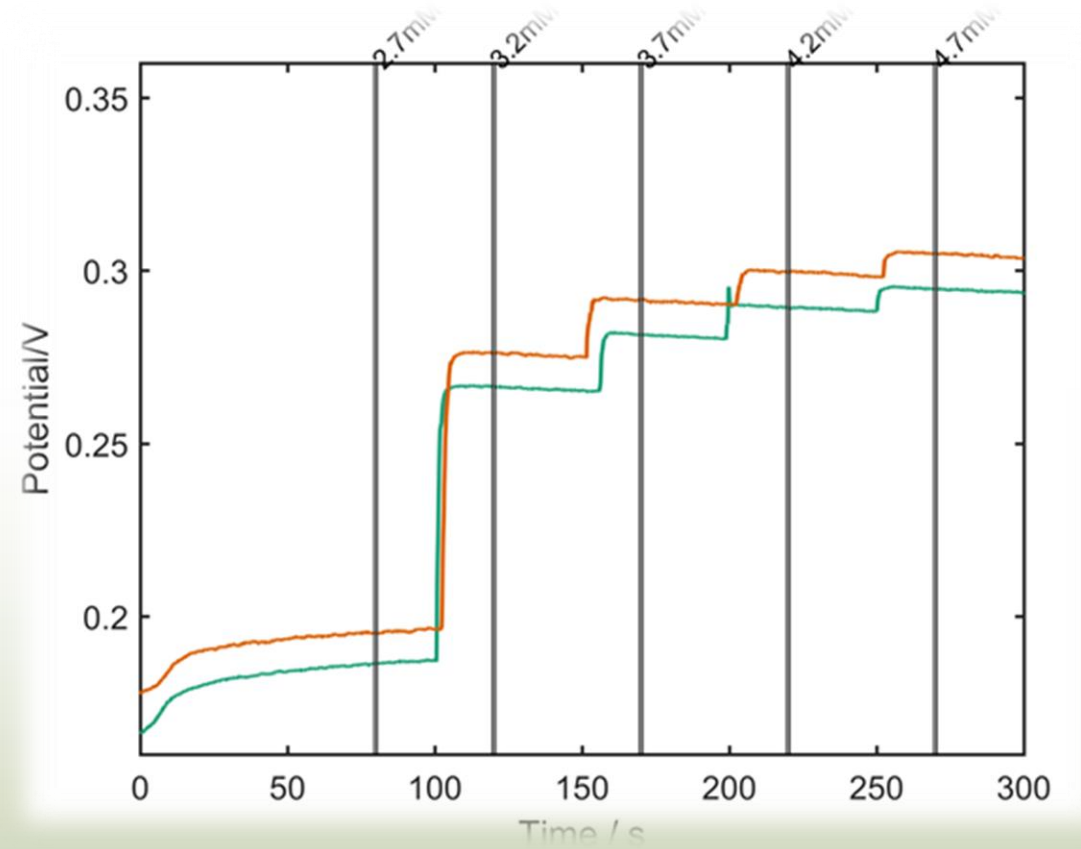
Sodium sensors



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Time for practical – potassium sensor

- ONE – Put the AnaPot into potentiometric mode.
- TWO – Onto the sensor put a low potassium concentration.
- THREE – Onto the sensor put a higher concentration of potassium.
- FOUR – What did you observe?



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