ENHANCING LEARNING THROUGH HANDS-ON EXPERIENCE

ELECTROCHEMISTRY EDUCATIONAL KITS

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Electrochemistry educational kits are alternatives to the insufficient of electrochemical analysis equipment in schools and universities.

With over two decades experiences in wireless communication, we successfully developed NFC with sensor interface chip enabling low-cost and portable electrochemical analysis device for individual learning experience anytime anywhere.

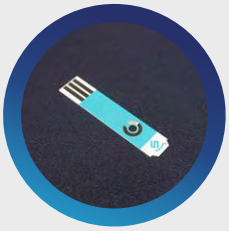
THE KITS CONSIST OF

1 WIRELESS POTENTIOSTAT & GALVANOSTAT KIT

NFC / Bluetooth

2 MOBILE APPLICATION

Android/ iOS



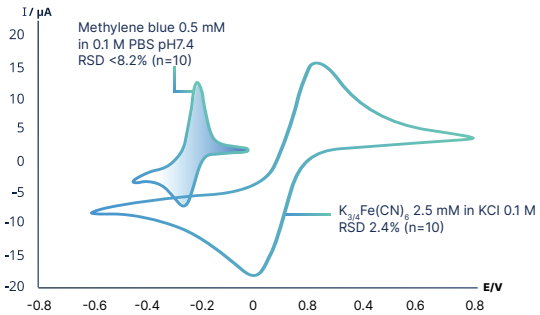
3 SCREEN PRINTED ELECTRODES (SPEs)

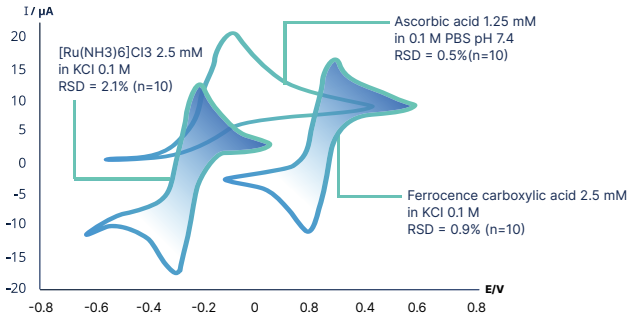
Carbon-Gr

ADVANTAGES

- **Increase accessibility to electrochemistry lab:**
  A budget-friendly portable galvanostat and potentiostat kit provides a hands-on learning experience for all students.
- **Gain more understanding in input-output signal in electrochemical analysis:**
  Students can easily understand the input and output signal of their measurement configuration through real-time graph.
- **Capability to achieve higher technology readiness level:**
  Students can easily understand the input and output signal of their measurement configuration through real-time graph.
- **Improved teaching efficiency:**
  Engage and motivate students by utilizing easy-to-use innovative galvanostat and potentiostat kit.
- **Multidiscipline skills:**
  Students can practice both analytical chemistry and NFC wireless technology using their own smartphones.

Cyclic Voltammograms of Various Electrochemical Substances using Silicon Craft's SPEs

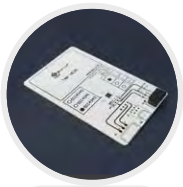




SENSOR PRODUCT SUMMARY







	SIC4340	SIC4341	SIC824B	SIC4343 Single-Ended Mode	SIC4343 Differential Mode
RFID Features					
Working Principle	Chip excites sensor with current, then measures the changes in sensor through voltage.	Chip excites sensor with potential and induce electrochemical reaction to occur, then measures the changes in sensor through current.		Chip measures voltage with respect to GND.	Chip measures voltage between 2 pins.
Communication Interface	NFC Type 2 Tag ISO/IEC 14443 A		Bluetooth® 5.2 BLE	NFC Type 2 Tag ISO/IEC 14443 A	
Power Management	RF On-chip regulator 1.9 V		Lithium rechargable battery 3.7 V 320 mAh	RF On-chip regulator 1.9 V	
Number of Channels	3 I/O 3 channels - configurable	3 I/O Configurable WE, RE, CE	3 I/O Fixed position WE, RE, CE	3 I/O 2 channels - configurable Voltage source = 2 pins ADC input = 1 pin	3 I/O 1 channel - configurable Voltage source = 1 pin ADC differential input = 2 pins
Voltage Source					
Bias Wave Form	-	DC			
Bias Voltage Range, Resolution	-	V(WE-RE) -0.8 V to +0.8 V, 5mV/step	V(WE-RE) **SIC824B16: 1.6 Dynamic voltage range, 5 mV/step** -1.6V to 0V -0.8V to +0.8V 0V to +1.6V **SIC824B32: 3.2 Dynamic voltage range, 10 mV/step** -1.6V to +1.6V	0.2 V to 1.2 V	
Bias Voltage Accuracy	-	± 6 mV	SIC824B16 : 1.6 Dynamic voltage range, ± 6 mV SIC824B32 : 3.2 Dynamic voltage range , ± 12 mV	± 6 mV	
Compliance Voltage	-	-1.3V to +1.4V	± 2.2 V to ± 3.0 V	-	
Current Source					
Bias Wave Form	1) DC 2) Square wave at selectable frequency 300Hz – 50kHz	-	-	-	-
Bias Current Range	Range 0: 1 - 63 µA Range 1: 8 - 504 µA	-	-	-	-
Bias Current Resolution	Range 0: 1 µA /Step Range 1: 8 µA /Step	-	-	-	-
Bias Current Accuracy	Range 0: ± 0.5 µA /Step Range 1: ± 4 µA /Step	-	-	-	-
Analog Input					
Input Impedance	Input buffer is enabled: > 10 MΩ Input buffer is disabled: 18 - 42 kΩ	-	-	Input buffer is enabled: > 10 MΩ Input buffer is disabled: 18 - 42 kΩ	Input buffer is enabled: > 10 MΩ Input buffer is disabled: 18 - 42 kΩ
Measured Current Range	-	Selectable ± 2.5 uA ± 20 uA	Fixed by hardware 50, 100, 150, 200, 250, 350, 400, 500 uA	-	-
Measured Voltage Range	Input buffer is enabled: 0.2 V to +1.2 V Input buffer is disabled: 0 V to +1.2 V	-	-	Input buffer is enabled: 0.2 V to 1.2 V Input buffer is disabled: 0 V to 1.2 V	Input buffer is enabled: -1 V to +1 V Input buffer is disabled: -1.2 V to +1.2 V
Measured Accuracy	± 2.5 mV	± 5 nA for ± 2.5 uA ± 20 nA for ± 20 uA	0.1% of current range	± 2.5 mV	
Data Conversion Rate	10 sps		50 sps	10 sps	
Memory					
User Memory	144 bytes		376 kbytes	144 bytes	
Erase/Write Cycles	100,000		10,000	100,000	
Data Retention	10 years at 70°C		15 years at 85°C	10 years at 70°C	
Compatible Analysis Techniques					
	Electrical condutivity (EC)	Amperometry Voltammetry	Amperometry Voltammetry Open Circuit Potential (OCP)	Open Circuit Potential (OCP) Single-Ended Voltage Measurement	Differential Voltage Measurement (resistive divider, wheatstone bridge)
Form Factor					
Leadless	QFN16L 3×3		-	QFN16L 3×3	
PCB	Dev Kit 85.6 mm x 54.1 mm		with Housing 90 mm x 40 mm	Dev Kit 85.6 mm x 54.1 mm	

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