

## Platinum Electrode

KWE03, KWE04

### Platinum Foil Electrode

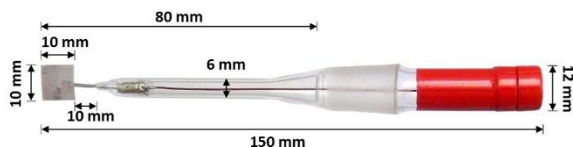
This electrode contains a thin square sheet of platinum mounted in a glass tube with a platinum wire. This electrode is used as a counter electrode in most of the electrochemical measurements.



## Product details

The platinum-foil electrode is made up of a platinum sheet and platinum wire. Part of the platinum wire is connected with copper wire inside a glass shaft to make an electrical contact. The standard ground-joint enables easy assembly and compatible with all KLyte electrochemical cell set up. Two types of SGJ KLyte electrodes are available, 14/23 and 10/18. The customized size of the platinum sheet, required for any specific application, is also available.

## Electrode dimensions



KWE03, SGJ 14/23

## Specification

	KWE03	KWE04
<b>Electrode</b>	KWE03	KWE04
<b>Material</b>	Pt	Pt
<b>Purity</b>	99.95%	99.95%
<b>Shaft material</b>	Borosilicate glass	Borosilicate glass
<b>Electrode Plug-in-head</b>	Compatible with KLyte banana connector cable (4mm)	Compatible with KLyte banana connector cable (2mm)
<b>Standard Ground Joint sleeve</b>	14/23	10/18
<b>Shaft diameter (Top)</b>	12mm	9mm
<b>Shaft diameter (Bottom)</b>	6mm	6mm
<b>Total Length (approx.)</b>	150mm	120mm
<b>Area of Pt-foil</b>	10mmX10mm	5mmx5mm
<b>Pt wire OD</b>	1mm	0.5mm

## Cleaning and storing

Pure platinum metal is one of the most effective materials for counter/auxiliary electrodes due to its high electrical conductivity and resistance to corrosion. Generally, the Pt-foil remains clean after the experiments, and the surface looks shiny. However, the appearance of the dull surface indicates the surface contamination. Further, surface contamination can also be detected by performing cyclic voltammetry in a pure electrolyte (e.g., 0.5mol/L aqueous  $H_2SO_4$ ). The occurrence of additional peaks other than the traditional voltammogram indicates the presence of surface contamination. In any case, the surface must be cleaned before using it as a working electrode. The cleaning of the Pt-electrode can be achieved by the following methods:

➤ **The chemical method for cleaning:** Organic impurities can be cleaned with a suitable organic solvent (e.g., ethanol).

Protein deposits can be hydrolyzed with a suitable commercial enzyme-based cleaner.

Inorganic deposits can be cleaned using dilute acid and base (0.1 mol/L HCl,  $HNO_3$ , NaOH). Hot dilute acid/base solutions can be taken if the ambient temperature does not work. In general, hot 10% nitric acid removes most of the inorganic impurities.

Persistent organic/inorganic impurities on the platinum surface are removed by using stronger oxidizing agents, such as freshly prepared Piranha solution (3:1 mixture of concentrated sulphuric acid and 30% hydrogen peroxide) and Aqua regia (3:1 mixture of concentrated hydrochloric acid (37%) and concentrated nitric acid). Since these oxidizing agents are strong enough to dissolve the metal from the metal surfaces, the exposure of the electrode metal into these solutions should be minimized.

*Note: One should be very careful in preparing, handling, and disposing of the Piranha solution. Mixing the solution is exothermic (hydrogen peroxide should be added slowly into concentrated sulphuric acid), and the temperature can reach above 100°C and can be explosive.*

- **The electrochemical method for cleaning:** Platinum electrode can be cleaned by doing multiple cyclic voltammetry in a clean solvent (10 to 20 cycles). The consistent impurities can be removed by holding the electrode either at a high oxidizing or reducing potential in dilute acid solution (0.1 mol/L sulphuric acid) for few seconds to few minutes depending upon the nature and level of impurity.
- **Storing:** The platinum foil part of the electrode should be kept immersed in DI water in an airtight container while not in use.

## Optional Parts



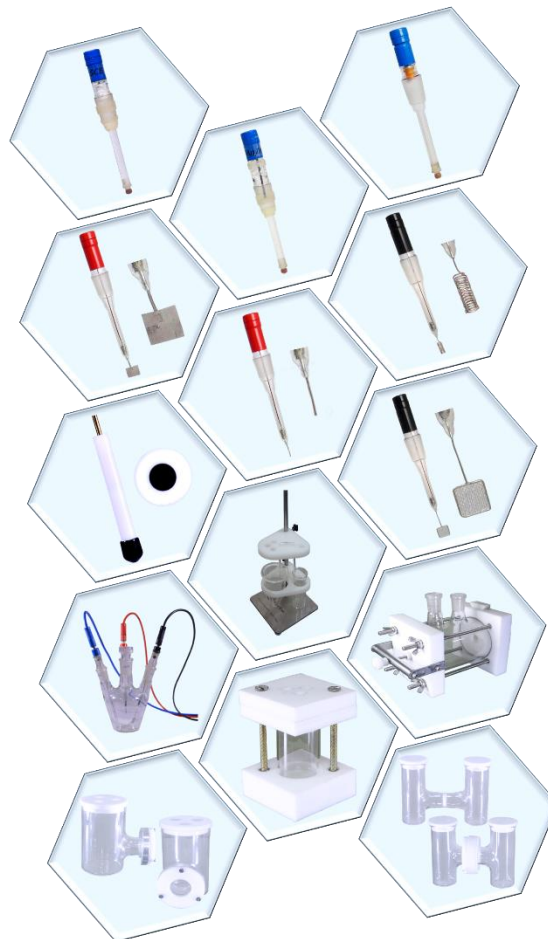
**KEC10A**  
Banana Cable Set



**KEC10B**  
Banana Connector Pin



**KA01 (Red), KA02 (Black)**  
Alligator Clip



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### Product Information Leaflet



**Platinum Foil Electrode**  
Product ID: KWE03 and KWE04

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