cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

Nicola Ricotta's STSM – "Optimisation of the use of Pleco to locally and safely clean the tarnishing developing on sterling silver heritage artefacts"

Protocol for using the Pleco electrolyte pencil as an analytical tool

cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

1. Measurement of GC potential

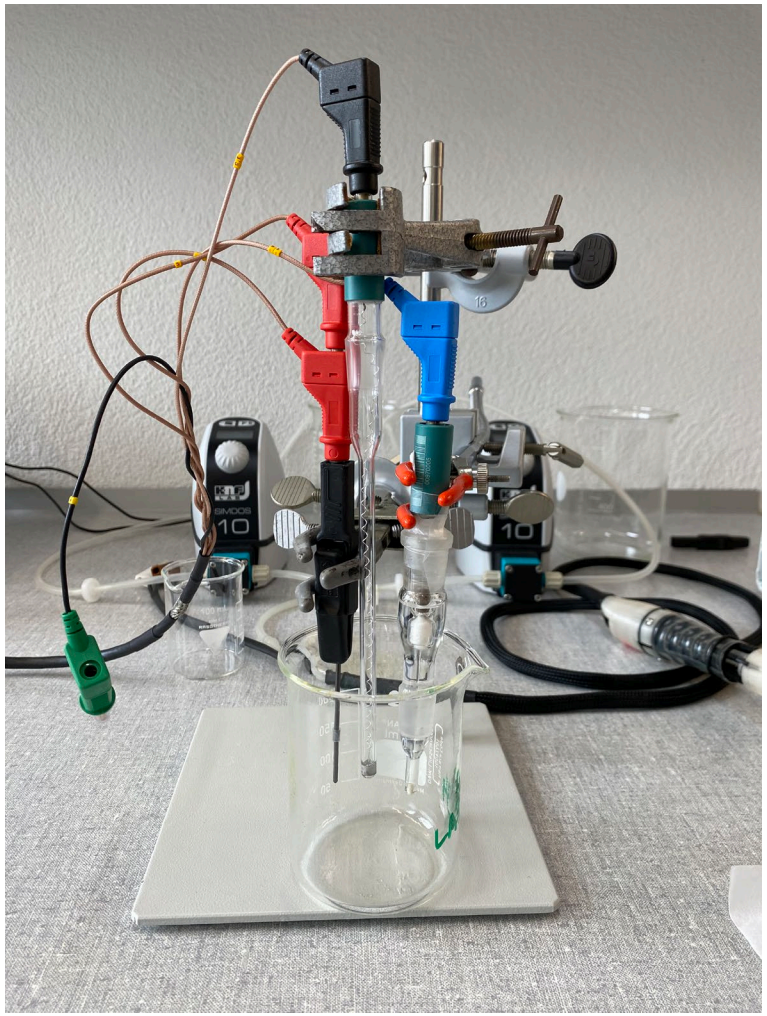
2. Setting measurement parameters

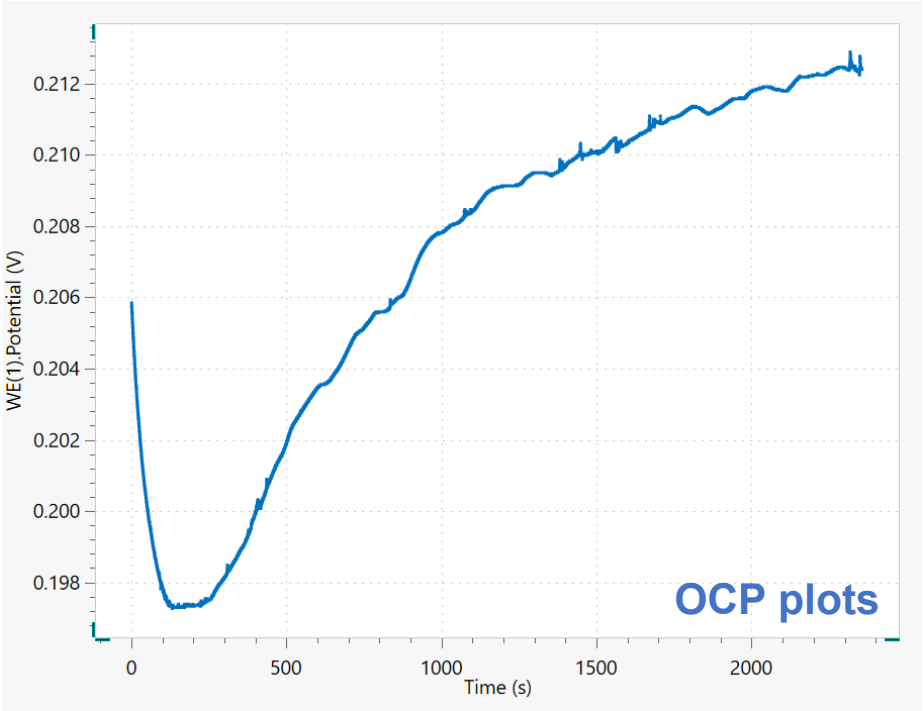
3. Characterization of tarnishing by LSV

4. Pre-removal of copper corrosion products, if needed

5. Performing Chronoamperometry

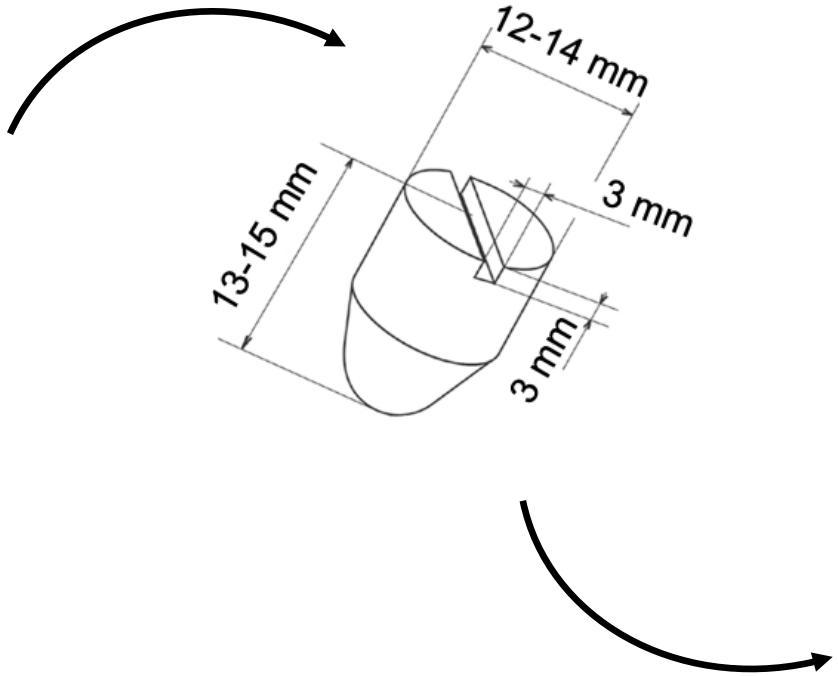
6. Surface burnishing





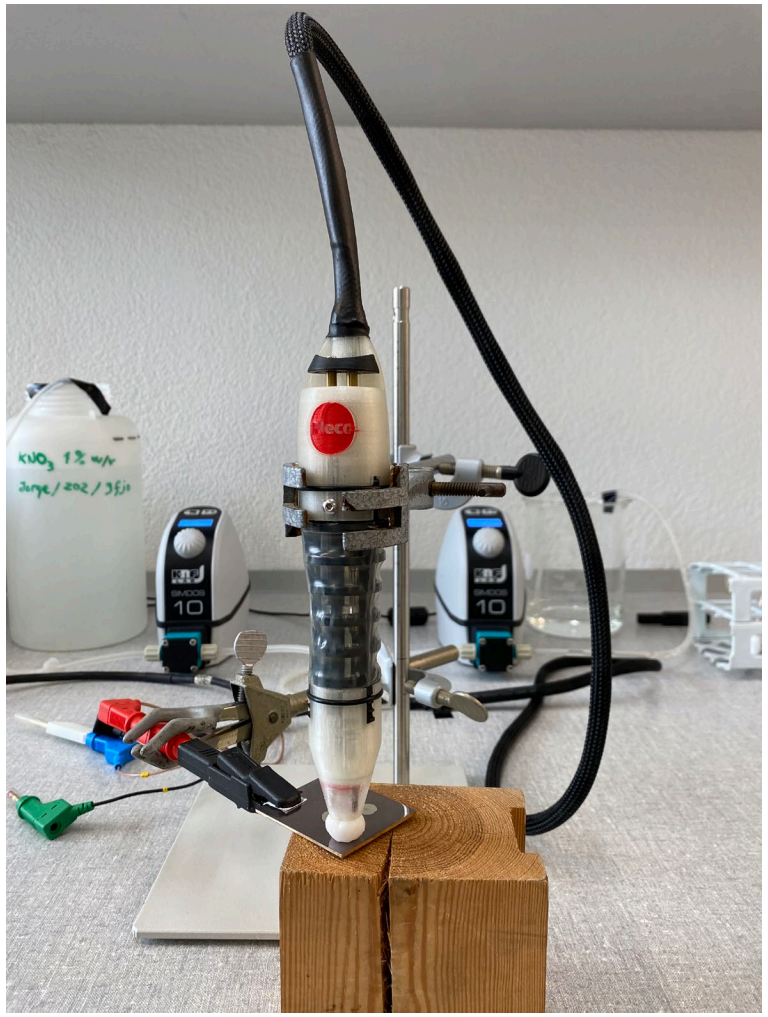
1. Measurement of GC potential

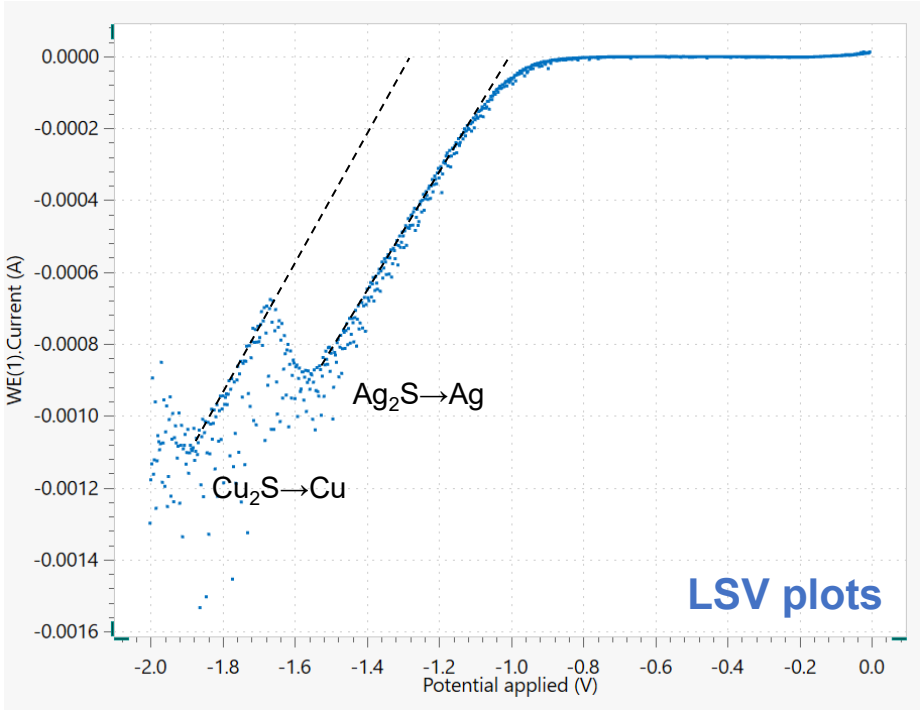
GC is not used as a RE, which is why it is important to verify the stability of its potential by OCP.



2. Setting measurement parameters

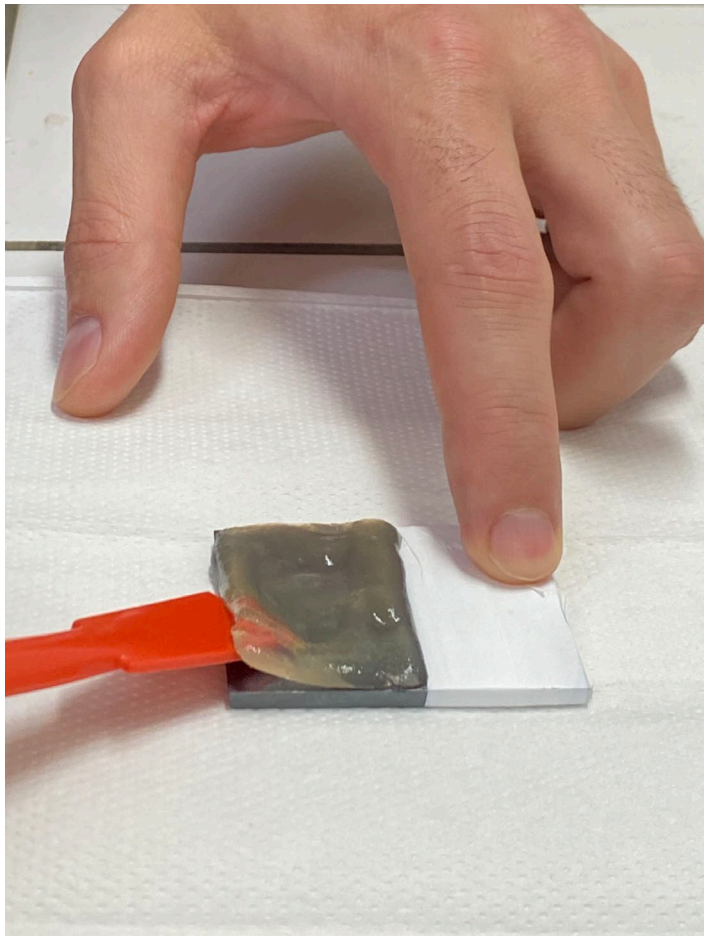
Pleco's electrolytic cell sealing conditions, pad shapes and sizes, and electrolyte supply and extraction flow values are critical to minimize current fluctuation in LSV plots.

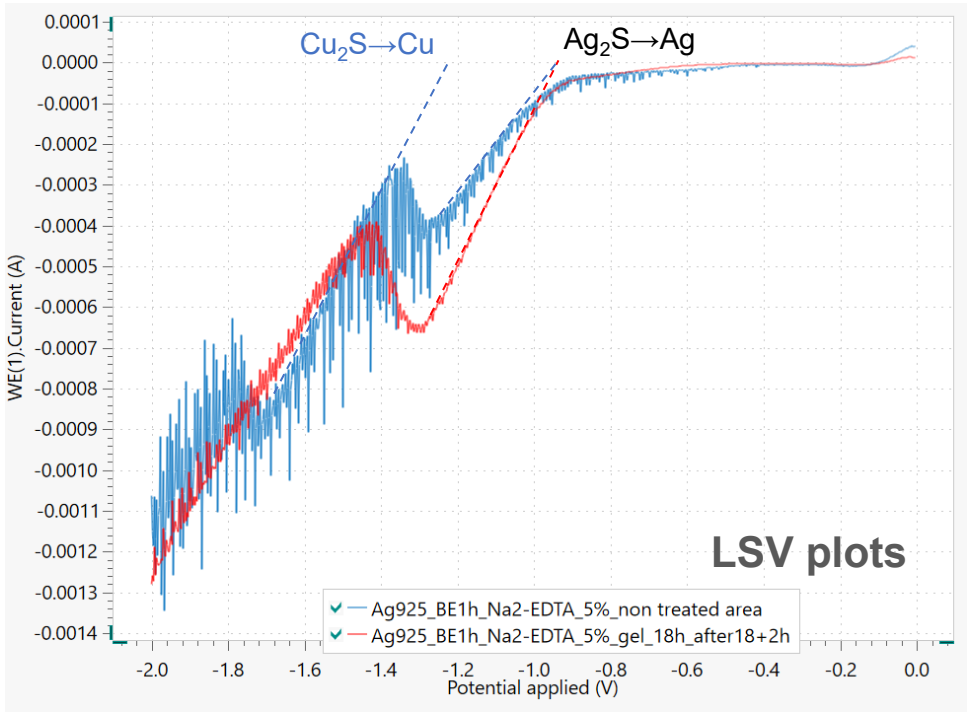




3. Characterization of tarnishing by LSV

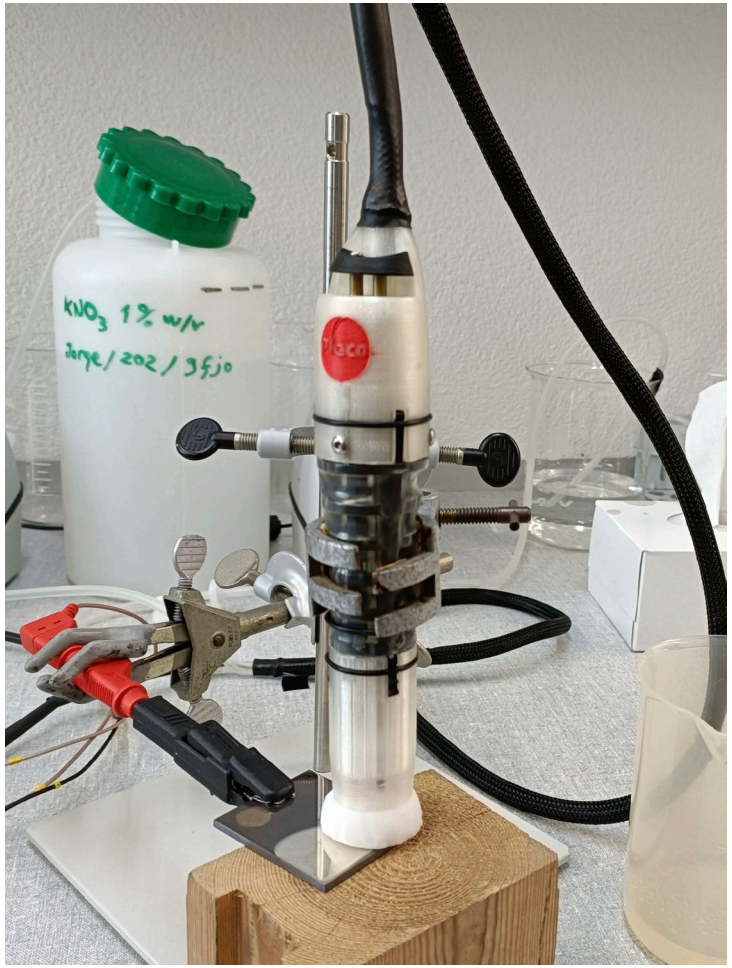
Using LSV, silver tarnish and associated reduction peaks can be investigated.

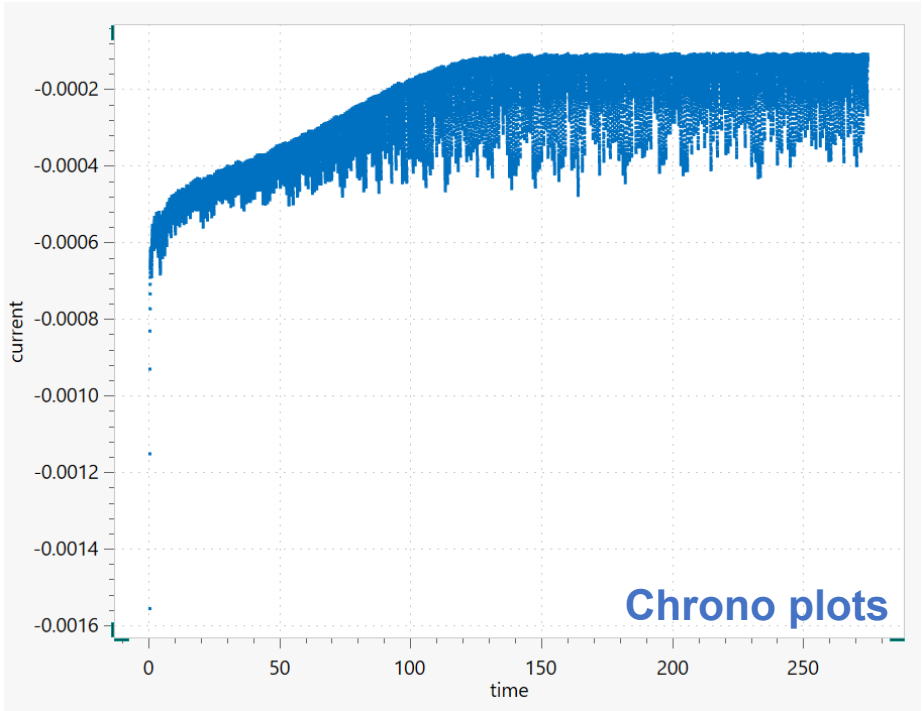




4. Pre-removal of copper corrosion products

Using a 5% disodic EDTA made alkaline to pH 10 in agar-agar gel, copper-based corrosion products present in silver tarnish of sterling silver can be removed, allowing then the safe electrolytic cleaning of silver tarnish.





5. Performing chronoamperometry

By means of chronoamperometry it is possible to determine, for a given potential, the duration of tarnish reduction. In this chronoamperometry plot, after about 120 seconds at a potential of -1.2 V/GC, cleaning is complete.

6. Surface burnishing

Using a cotton cloth, the surface can be mechanically burnished after electrolytic cleaning to achieve a desired level of surface finish.