General guidelines for cleaning electrodes

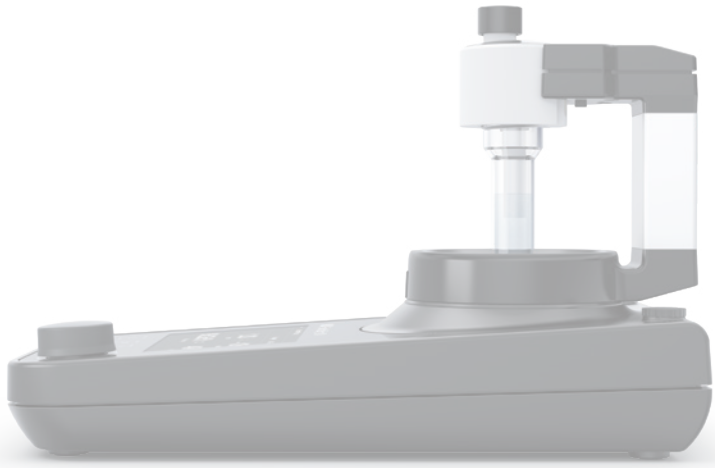
In general, electrodes are recycable; however, the usable lifespan of an electrode depends on both the electrode and reaction type. Harsh reactions that deposit polymers or salts on the electrode may shorten the lifespan of an electrode if these cannot be removed. Visual inspection (looking for significant particle buildup, color change, or degradation) of an electrode after it is cleaned is the best way to assess if an electrode should be retired. For reaction types that are consistently harsh, and tend to be hard on electrodes, we recommend using graphite electrodes.

Electrodes can be cleaned by washing with solvent, acid or base solutions, buffing with fine grit sandpaper, or through anodic mineralization.

› For washing electrodes, often simply rinsing and sonicating the electrode in acetone or other organic solvents followed by water will remove buildup. For certain electrodes, rinsing with dilute acid or base may also help to remove certain impurities. This of course depends on the electrode type (for example, magnesium electrodes will react with acid and can dissolve over time) and the impurities one is trying to remove.

› If the electrode is still not clean, it can also be treated with fine grit sandpaper or scrubbed with alumina slurry to remove buildup or oxide layer on the surface. For the gold, platinum and silver plated electrodes this should not be done since the metal plating could be removed revealing the core of the electrode.

› Another method for cleaning the electrode is through anodic cleaning. Using the electrode as the anode in a ~1 M solution of sulfuric acid and running a constant potential of 1 – 3 V for a few minutes can help clean the electrode by oxidizing impurities on the surface. This procedure however should only be used for glassy carbon and the boron doped diamond electrodes.



Note: All electrodes can tolerate various organic solvents and sonication

Material	Acid wash (1 M HCl)	Base wash (1M NaOH)	Sandpaper	Other comment
Graphite	⬡	⬡	⬡	It may absorb various compounds due to porosity
Glassy carbon	⬡	⬡	⬡	Best method is to polish the electrode
RVC	⬡	⬡	⬢	Fragile
Lead bronze	⬡	⬡	⬡	
Lead	⬡	⬡	⬡	
Tungsten	⬡	⬡	⬡	
Niobium	⬡	⬡	⬡	
Copper	⬡	⬡	⬡	
Magnesium	◒	⬡	⬡	
Titanium	⬡	⬡	⬡	
Zinc	◒	◒	⬡	
Stainless steel	◒	⬡	⬡	
Platinum plated	⬡	⬡	⬢	
Gold plated	⬡	⬡	⬢	
Silver plated	⬡	⬡	⬢	
Aluminium	◒	◒	⬡	
Boron doped diamond	⬡	⬡	⬢	
Tin	⬡	⬡	⬡	
Ni	⬡	⬡	⬡	
Ni foam	⬡	⬡	⬢	
Reference electrode (glass)	⬡ (outside)	⬡ (outside)	⬢	Empty liquid inside and refill with new solution – no sandpaper on the outside; acid and base are okay for outside

⬡ No problem
◒ Small damage, but ok if necessary
⬢ Not recommended