

# STRIPPING VOLTAMETRY

**Dr. Anshumala Vani**  
**S.S. in Chemistry & Biochemistry**  
**VIKRAM UNIVERSITY, UJJAIN**

# CONTENTS

- ❖ INTRODUCTION
- ❖ ANODIC STRIPPING VOLTAMMETRY
- ❖ CATHODIC STRIPPING VOLTAMMETRY
- ❖ ADSORPTIVE STRIPPING VOLTAMMETRY
- ❖ APPLICATIONS
- ❖ ADVANTAGES
- ❖ DRAWBACK

# INTRODUCTION

Electrochemical stripping analysis is a set of analytical chemistry methods based on voltammetry or potentiometry that are used for quantitative determination of ions in solution.

Stripping voltammetry are the most efficient electrochemical techniques for trace analysis.

In comparison to conventional polarographic work determination by SV are generally more sensitive.

Chemically modified electrodes have been employed for the analysis of organic and inorganic compounds.

# Electrode configuration



**Hanging Mercury  
Drop Electrode**



**Carbon-Paste  
Electrode**



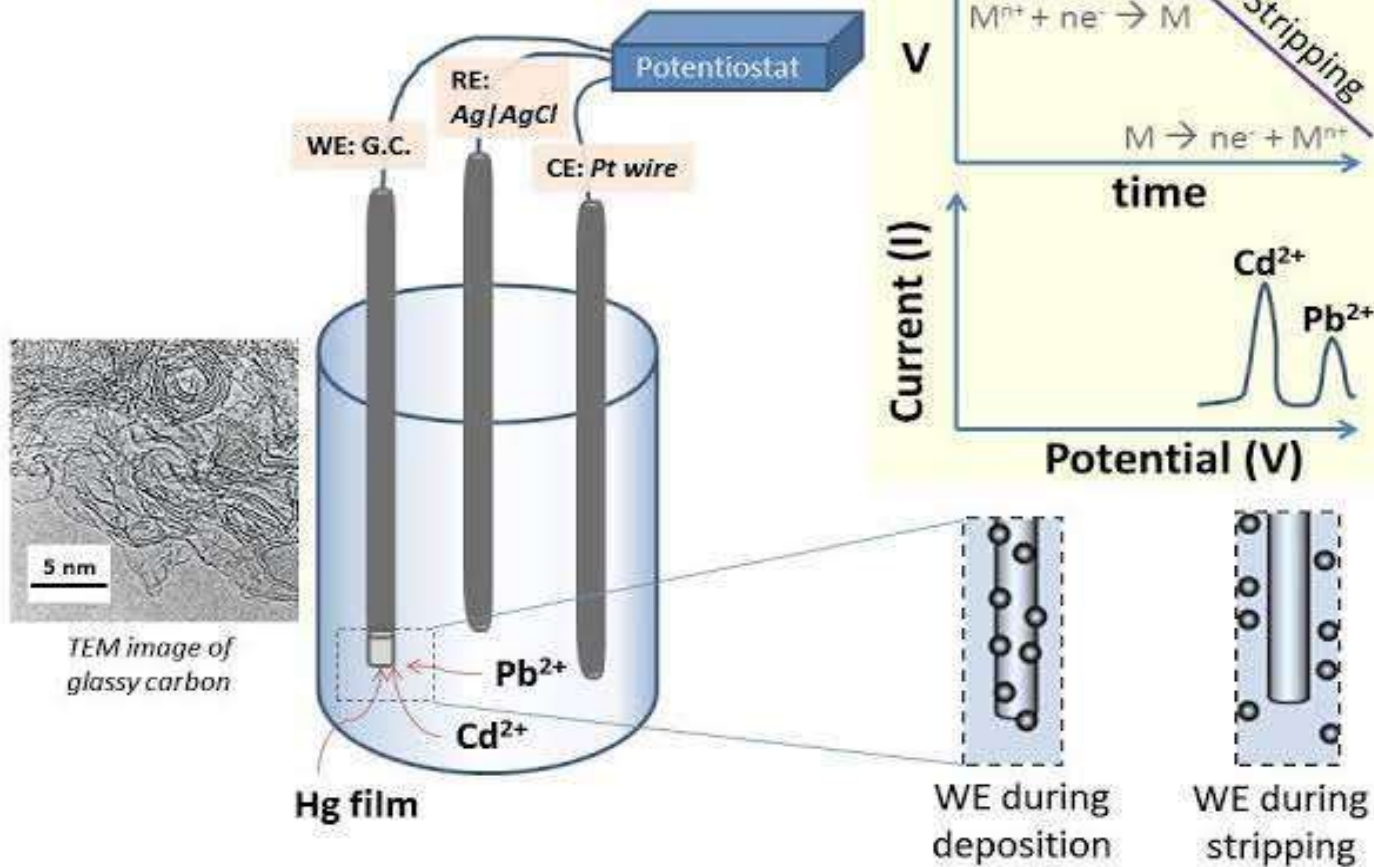
**Gold  
Electrode**

# ANODIC STRIPPING VOLTAMMETRY

- ❖ Anodic Stripping Voltammetry is a voltammetric method for quantitative determination of specific ionic species.
- ❖ It allows researchers to detect multiple types of dissolved metal in one experiment.
- ❖ The metal film formed during the reduction step concentrates the metal particles at the electrode, so the detection of very low concentrations (ppb range) of metal ions is possible.
- ❖ It detects  $\mu\text{g/L}$  concentrations of analyte. This method has an excellent detection limit (typically  $10^{-9}$  -  $10^{-10}$  M)
- ❖ The stripping step can be either linear, staircase, squarewave, or pulse.

# INSTRUMENTATION OF ASV

## How ASV works



Quantitative determination of cadmium and lead by Anodic Stripping Voltammetry

Moderator: Tami Lasseter Clare

# CATHODIC STRIPPING VOLTAMMETRY

- ❖ Mirror image of ASV.
- ❖ Except that for the plating step, the potential is held at an oxidizing potential, and the oxidized species are stripped from the electrode by sweeping the potential negatively.
- ❖ This technique is used for ionic species that form insoluble salts and will deposit on or near the anodic, working electrode during deposition.
- ❖ The stripping step can be either linear, staircase, squarewave, or pulse.

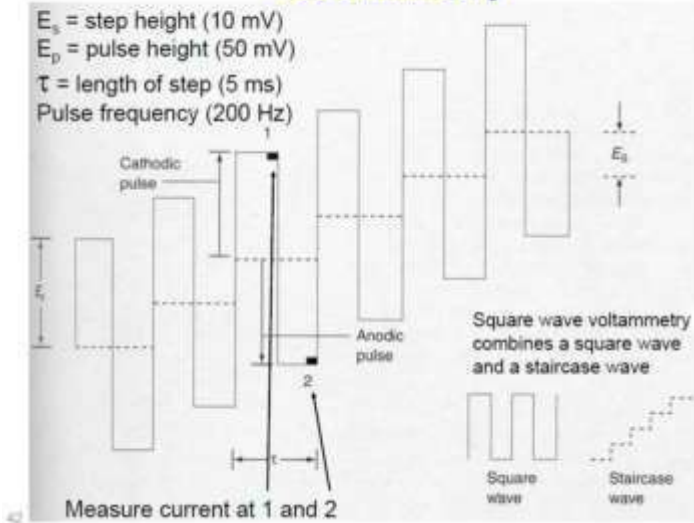
# Adsorptive stripping voltammetry

- ❖ Adsorptive stripping voltammetry is similar to both anodic and cathodic stripping voltammetry.
- ❖ Except that the preconcentration step is not controlled by electrolysis.
- ❖ The preconcentration step in adsorptive stripping voltammetry is accomplished by adsorption on the working electrode surface, or by reactions with chemically modified electrodes.

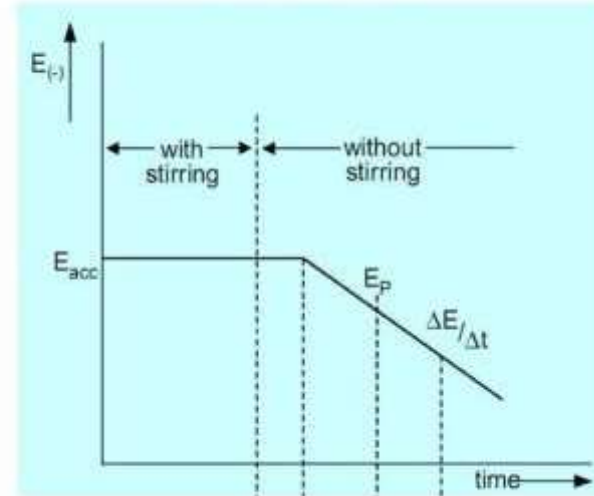


The stripping step for all three voltammetry methods can be either linear, staircase, squarewave, or pulse.

### Square Wave Cathodic stripping Voltammetry

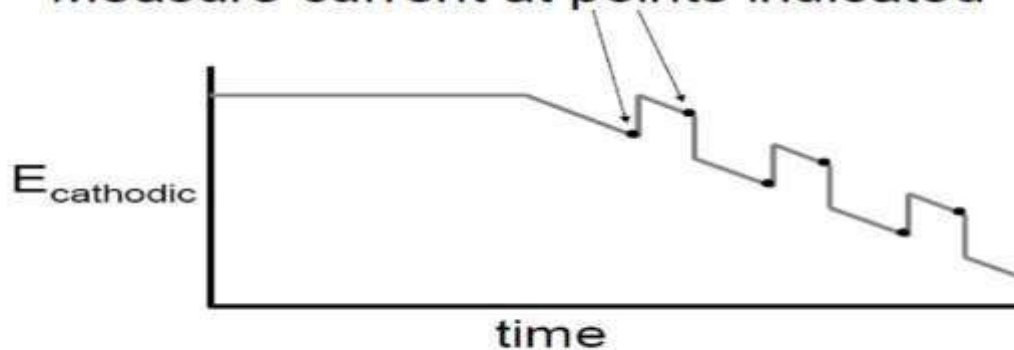


### Linear Scan Anodic Stripping Voltammetry



### Differential Pulse Anodic Stripping Voltammetry

- Measure current at points indicated



# APPLICATIONS OF STRIPPING VOLTAMMETRY

- ❖ Analysis of available copper, zinc and manganese contents in soil and vegetable samples.
- ❖ Determination of food contaminants
  - toxic metals, pesticide, fertilizers and veterinary drugs residuals , trace essential elements, food additive dyes and other organic compounds of biological significance.

# ADVANTAGES

- ❖ Low cost instrumentation
- ❖ Allow to detect multiple types of dissolve metals in one experiment
- ❖ Accuracy and fast result.
- ❖ Sensitive and chemical species selective technique.