

### Introduction

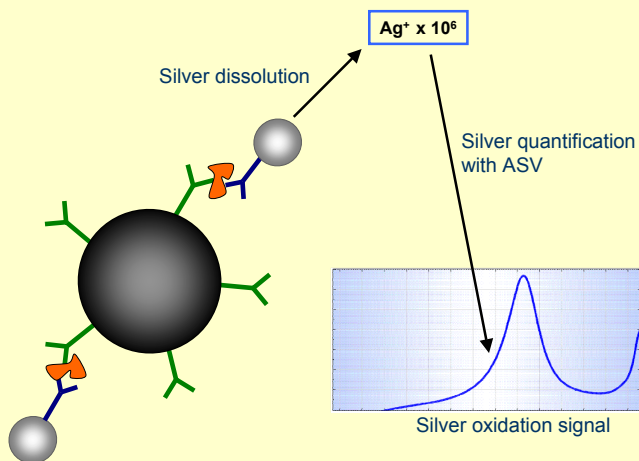
Immunoassays with electrochemical detection of metal marker generally follows the same procedure. That is the dissolution of metal nanoparticle (NP) and the consecutive quantification of solubilized metal ions by anodic stripping voltammetry (ASV) at carbon electrode.

The dissolution step is very important as it ensures the high sensitivity due to release of huge number of metal ions from one single NP. However, it requires the use of harmful reagents (such as HBr/Br<sub>2</sub> mixture for gold or HNO<sub>3</sub> for silver).

This work presents a new strategy for using silver nanoparticles (AgNPs) as a metal marker with the dissolution step that does not require a chemical oxidant and thus offering advantages for application in terms of fast response, reduced cost of analysis and procedural simplicity.

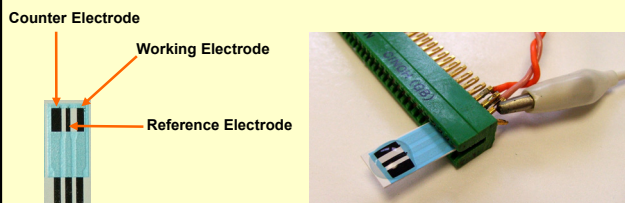
### Electrochemical measurement process

The assay is based on formation of sandwich immunocomplex between magnetic particles and silver nanoparticles.

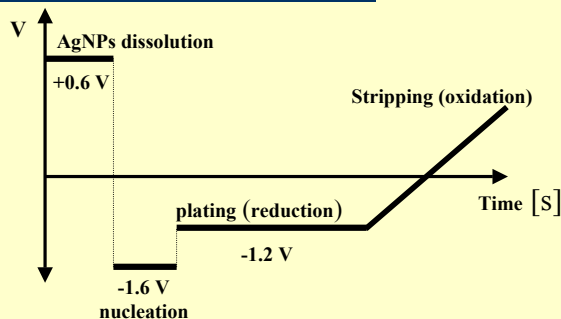


### Carbon Screen Printed Electrodes

The measurement takes place in 50-μL droplet on the surface of a carbon screen printed electrode.

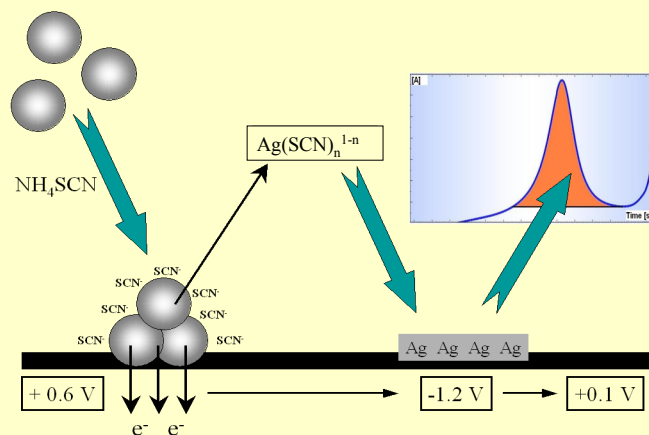


#### Steps of Anodic Stripping Voltammetry:

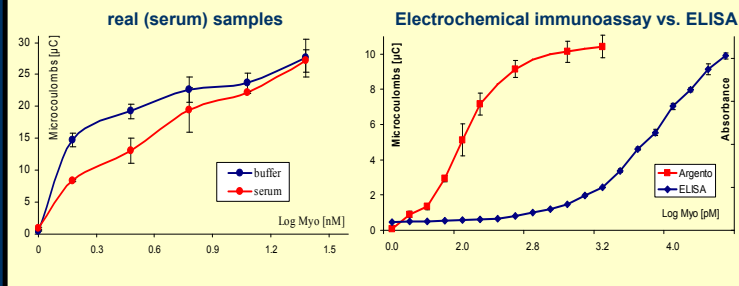


### Electrochemical behaviour of AgNPs

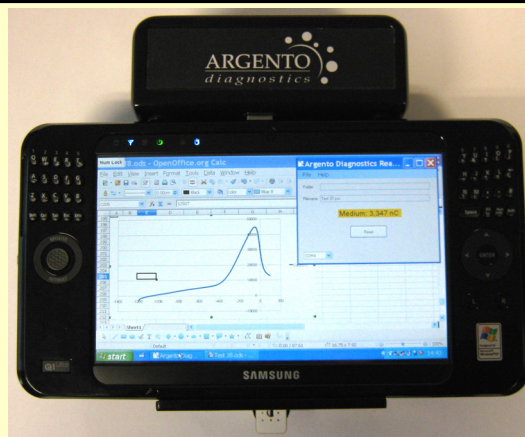
#### Mechanism of AgNPs dissolution.



#### Myoglobin Assay:



### Portable reader



### Conclusion

We demonstrated here and explained the mechanism of electrochemical immunoassay. The assay is capable of detection of myoglobin down to 12 pM and it works in real samples like serum. It can also be miniaturised and used as point of care medical device.