

# INVESTIGATION OF METALLIC SILVER NANOPARTICLES THROUGH UV-VIS AND OPTICAL MICROGRAPH TECHNIQUES

## Objective of work:

To characterize reduced silver nanoparticles in chitosan polymer doped with  $\text{AgNO}_3$  salt (CS:  $\text{AgNO}_3$ ) through UV-Vis and optical techniques.

## Sample characteristics:

One gram of CS powder was dissolved in 100 ml of 1% acetic acid. The solution was stirred for more than 24 hours at ambient temperature. Different amounts of silver nitrate ( $\text{AgNO}_3$ ) were added separately to this solution with continues stirring to prepare a different composition of CS/ $\text{AgNO}_3$  solid polymer electrolyte system. The homogenous mixture solutions were then cast into plastic Petri dish and allowed to dry at room temperature.

## Equipment for UV-Vis Analysis:

The UV-Visible spectra of the prepared films were recorded using a Jasco V-570, UV-Vis-NIR spectrophotometer (Jasco SLM-468, Japan) in the absorbance mode, at the wavelength range between 190 to 1500 nm.

## Data acquisition:

It was found a broad absorption band centered at 430 nm corresponding to the surface plasmon resonance (SPR) of the silver nanoparticles  $\text{Ag}^0$  reduced from silver ions  $\text{Ag}^+$ . An increase of the relative intensity of the SPR peaks was observed with increasing silver salt concentration.

Table I. The composition of CS: $\text{AgNO}_3$  solid polymer electrolyte films.

Designation	$\text{AgNO}_3$ (wt.%)	Chitosan (g)	$\text{AgNO}_3$ (g)
CSPE-0	0	1.00	0.0000
CSPE-1	4	1.00	0.0416
CSPE-2	8	1.00	0.0869
CSPE-3	12	1.00	0.1363
CSPE-4	16	1.00	0.1904
CSPE-5	20	1.00	0.2500
CSPE-6	24	1.00	0.3157

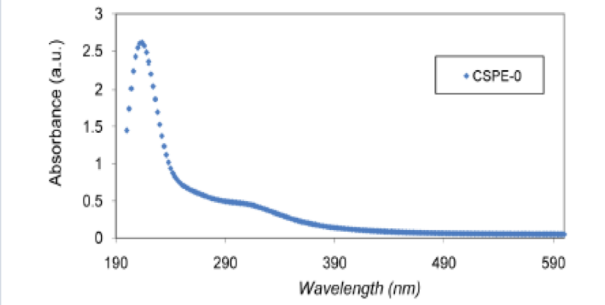


Figure 1. UV-Visible absorption spectrum for pure chitosan (CSPE-0) film.

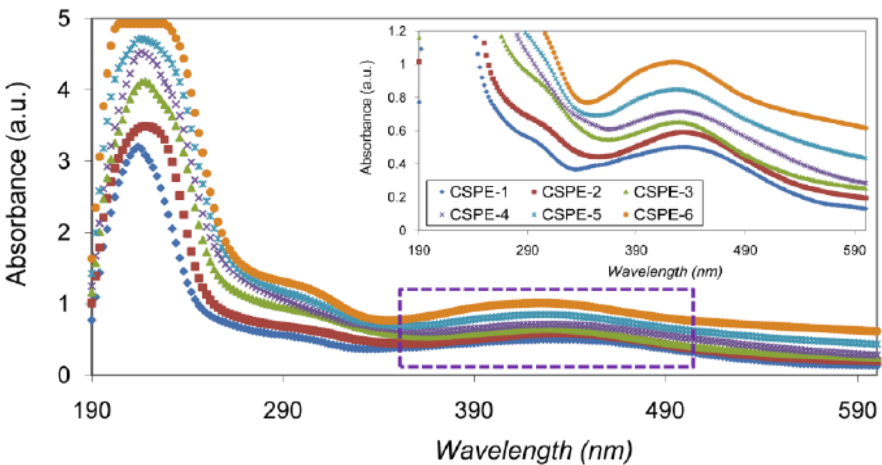


Figure 2. UV-Visible absorption spectra for CS: $\text{AgNO}_3$  solid films with different silver salt concentration.

Aziz, S. B. ( 1 ), Abdullah, O. G. ( 1 ), Saber, D. R. ( 1 ), Ahmed, H. M. ( 1 ), & Rasheed, M. A. ( 2 ). (n.d.). Investigation of metallic silver nanoparticles through UV-Vis and optical micrograph techniques. *International Journal of Electrochemical Science*, 12(1), 363–373. <https://doi-org.millenium.itesm.mx/10.20964/2017.01.22>