

Characterization and Electrical Properties of PVA Films with Self-Assembled Chitosan-AuNPs/SWCNT-COOH Nanostructures

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Table S1. Equations for the calculate of D_n , D_z and PDI , from distributions of particle size by Dynamic Light Scattering (DLS).

Name	Equation
Number average particle size:	$D_n = \frac{\sum n_i D_i}{\sum n_i}$
Weight average particle size:	$D_w = \frac{\sum n_i D_i^4}{\sum n_i D_i^3}$
z-Average particle size:	$D_z = \frac{\sum n_i D_i^6}{\sum n_i D_i^5}$
Polidispersity index:	$PDI = \frac{D_w}{D_n}$

The chitosan-AuNPs nanostructures, it was not possible to be identified by TEM, because the chitosan chains were separated from the AuNPs when was applied the electron beam accelerating voltage in order to increase the magnification, then temperature increased at the irradiated point and the chitosan chain were separated by electron beam, which through of the sample. Figure S1 shows the chitosan separated from the AuNPs and the agglomerated on the cover grid used in TEM.

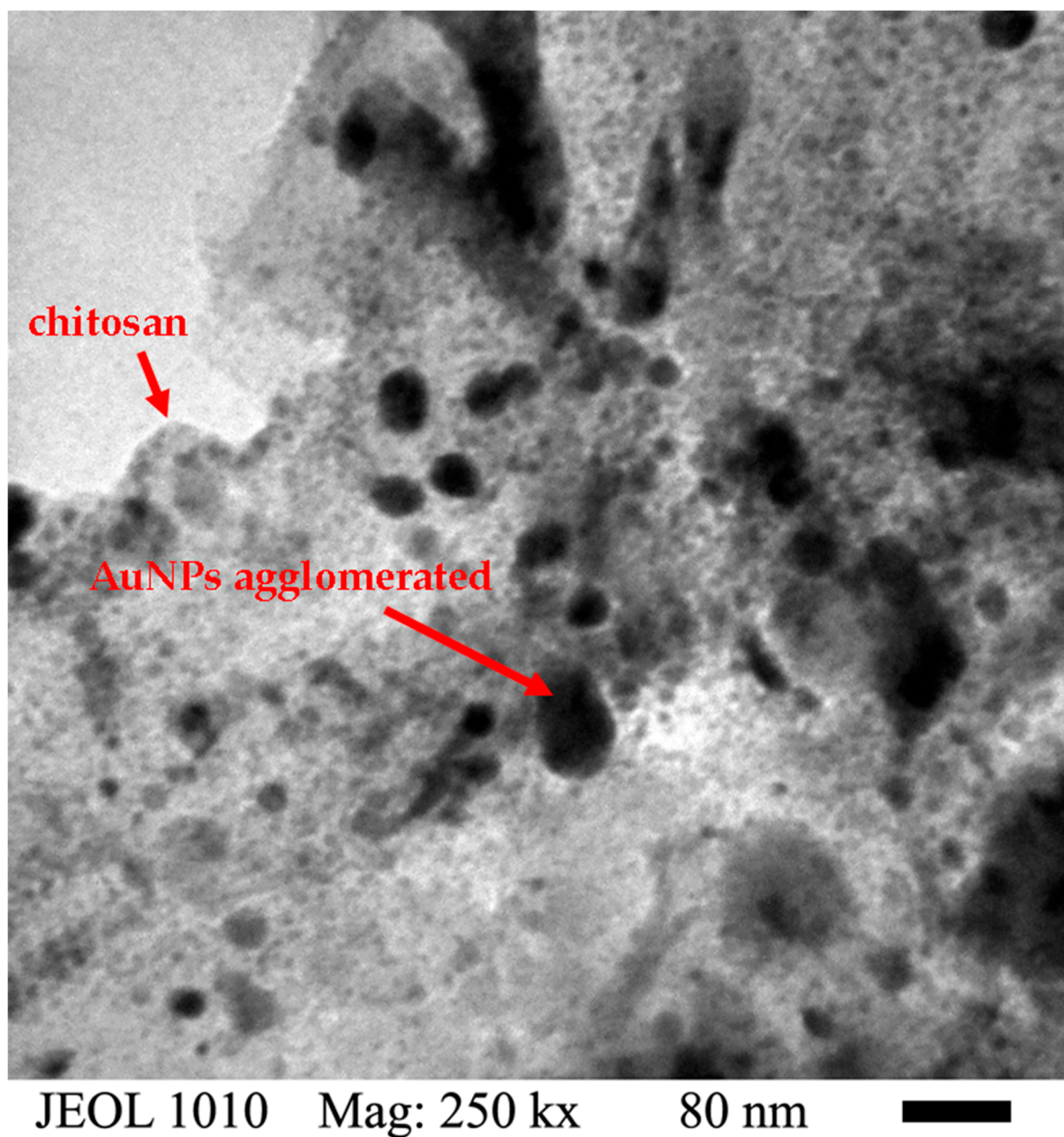


Figure S1. Photographs obtained by TEM of chitosan-AuNPs nanostructures collapsed on the copper grid for the concentration of 0.4mM $\text{HAuCl}_4 \cdot 3\text{H}_2\text{O}$.

Figures S2–S5 show the E_g calculations of the of PVA films with self-assembled chitosan-AuNPs/SWCNT-COOH nanostructures at the different $\text{HAuCl}_4 \cdot 3\text{H}_2\text{O}$ and SWCNT-COOH concentrations according to the Tauc's graph.

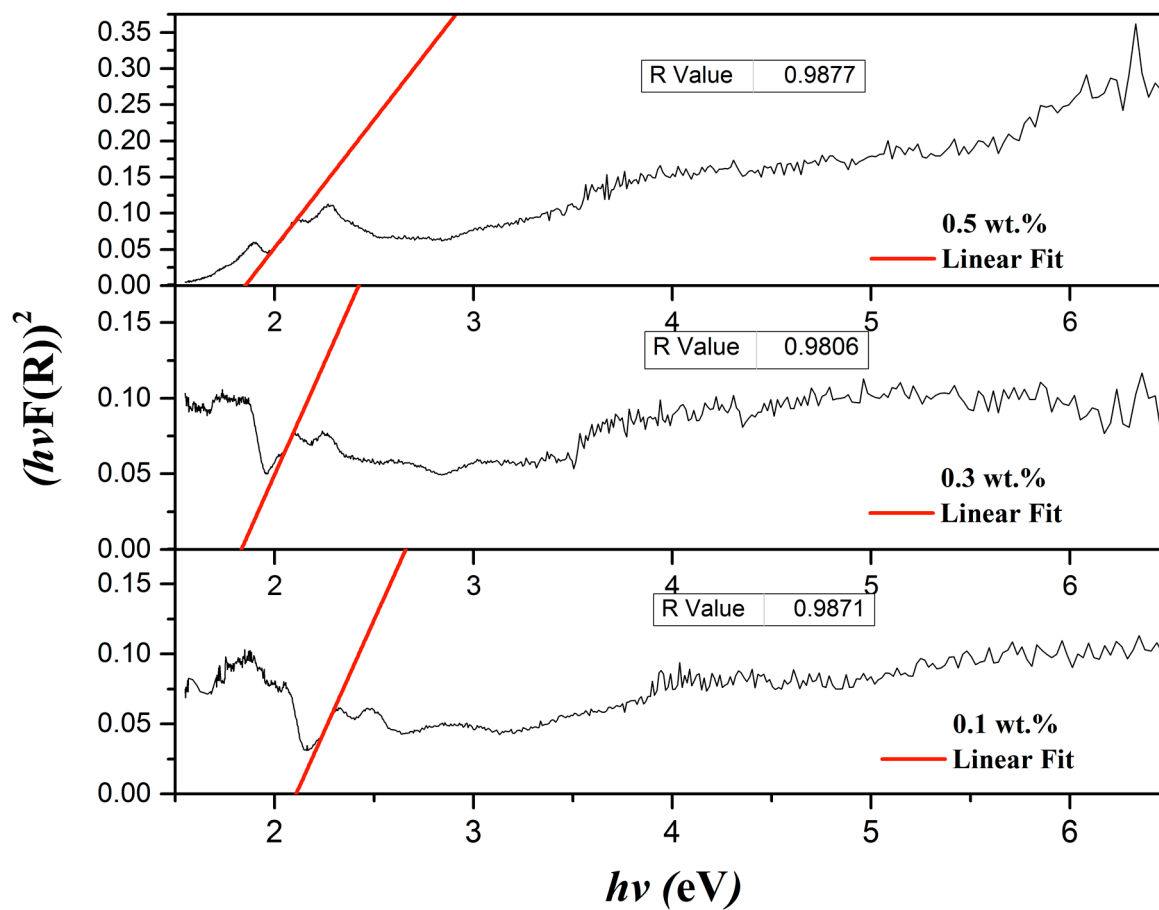


Figure S2. Eg calculations of 0.4 mM HAuCl₄·3H₂O concentration, and different SWCNT-COOH concentrations: 0.1, 0.3 and, 0.5 wt.%.

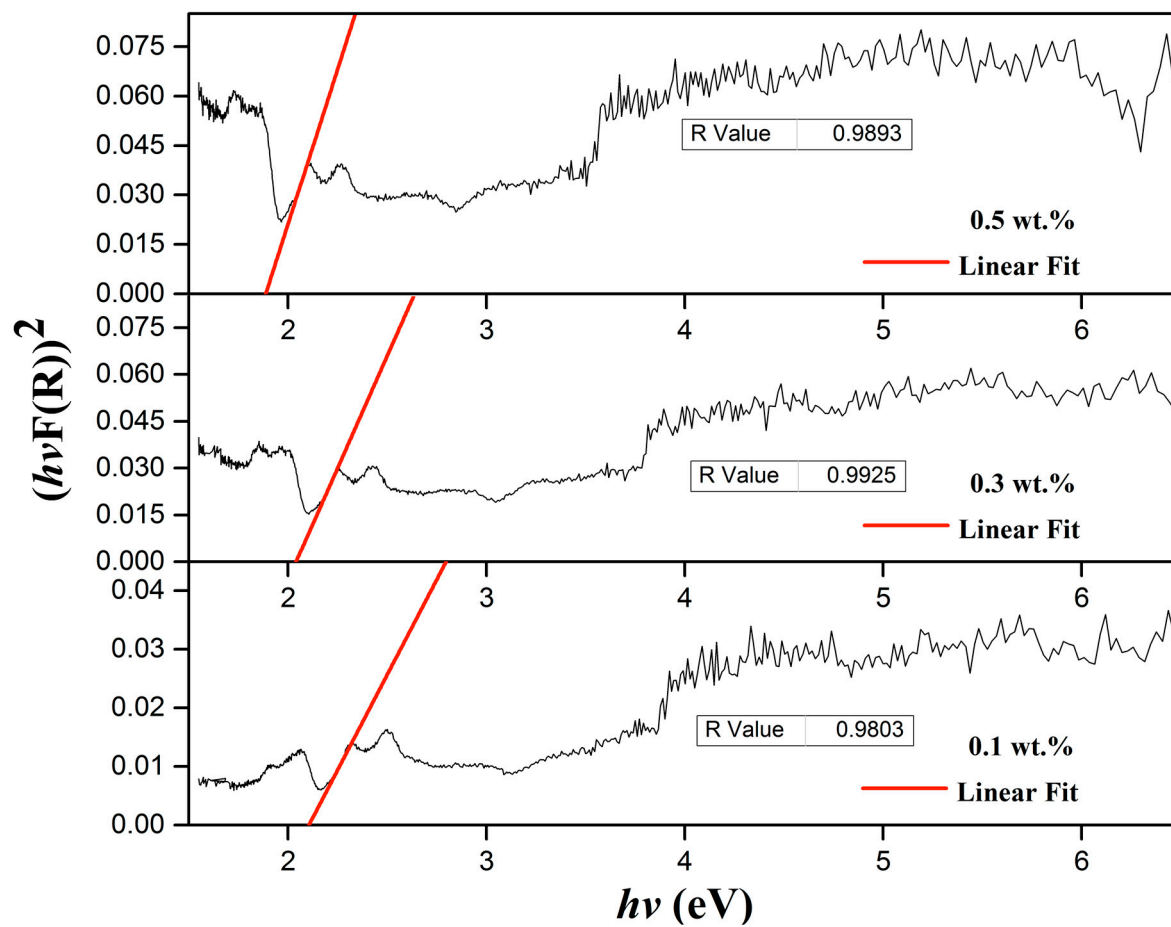


Figure S3. Eg calculations of 0.7 mM HAuCl₄·3H₂O concentration, and different SWCNT-COOH concentrations: 0.1, 0.3 and, 0.5 wt.%.

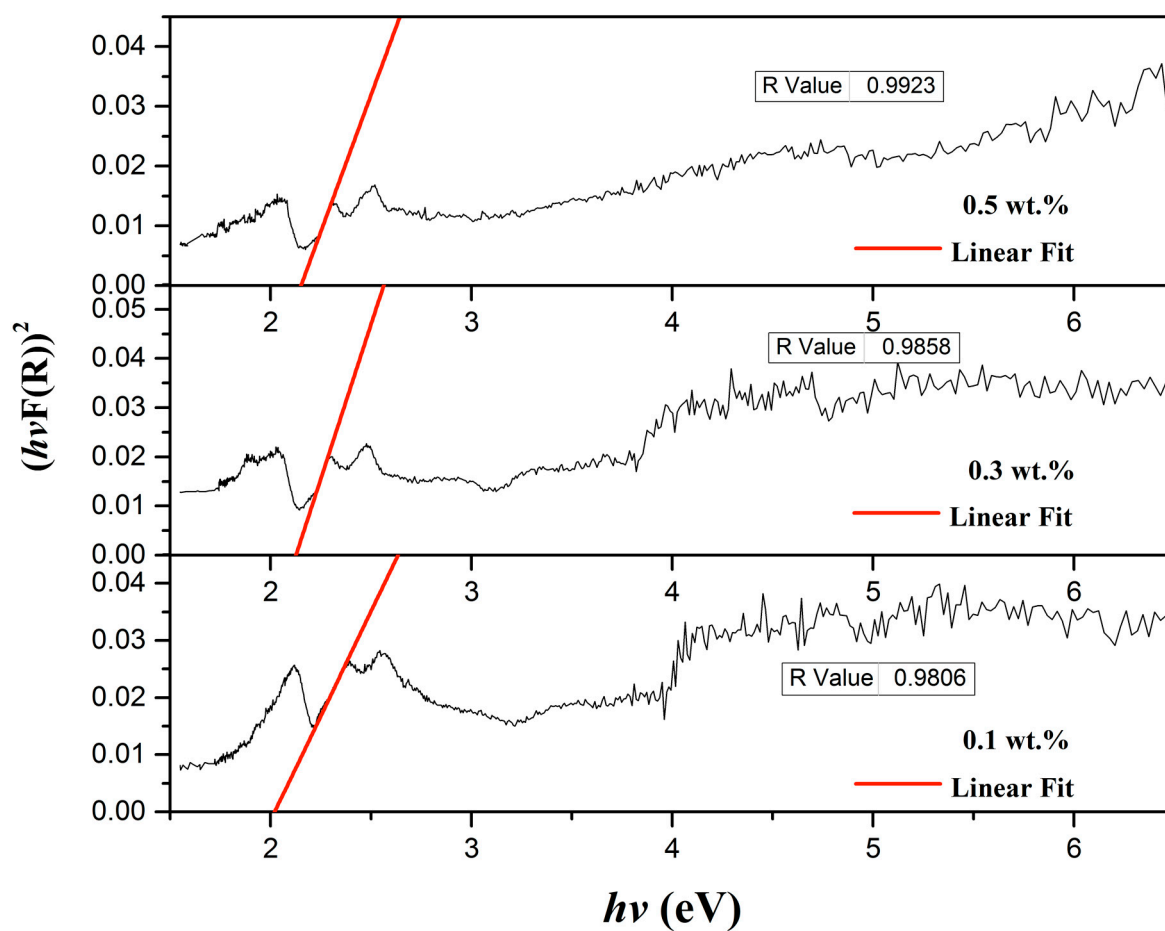
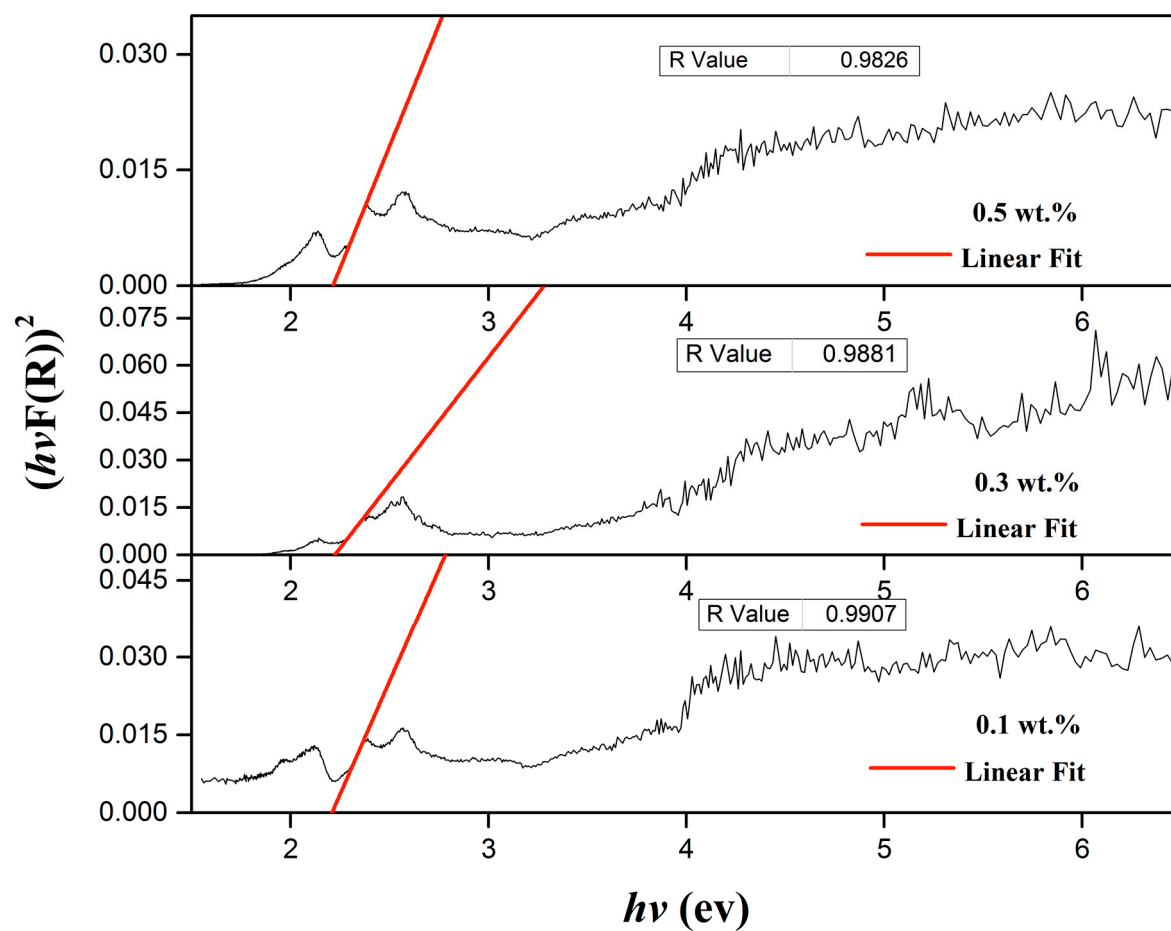


Figure S4. Eg calculations of 1.0 mM HAuCl₄·3H₂O concentration, and different SWCNT-COOH concentrations: 0.1, 0.3 and, 0.5 wt.%.



Figures S5. Eg calculations of 1.3 mM HAuCl₄·3H₂O concentration, and different SWCNT-COOH concentrations: 0.1, 0.3 and, 0.5 wt.%.