

10/17/2017

Tasklist:

- Prepare reducing agent stock solutions
 - Prepare AuNP for 100mM stock solutions
 - Measure UV/Vis of these solutions
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- Prepare reducing agent stock solutions
-Step 1: Complete the below calculations to determine how much of each substance need to be weighed

Calculations

-Fructose and Galactose Reducing Agent Stock Solutions

100mM = moles / 10mL

moles = 0.001 moles

(0.001 moles)(180.156g/mol) = **0.180156 grams**

-Chitosan Reducing Agent Stock Solution

50mM = moles / 10mL

moles = 0.0005 moles

(0.0005 moles)(168g/mol) = **0.084 grams**

-Sucrose Reducing Agent Stock Solution

100mM = moles / 10mL

moles = 0.001 moles

(0.001 moles)(342.296g/mol) = **0.034296 grams**

-Cellulose Nanocrystals Reducing Agent Stock Solution

100mM = moles / 10mL

moles = 0.001 moles

(0.001 moles)(162g/mol) = **0.162 grams**

-Na₃Ct Reducing Agent Stock Solution

100mM = moles / 10mL

moles = 0.001 moles

(0.001 moles)(294.1g/mol) = **0.2941 grams**

-H₂Asc Reducing Agent Stock Solution

100mM = moles / 10mL

moles = 0.001 moles

(0.001 moles)(176.1g/mol) = **0.1761 grams**

-Step 2: For fructose, galactose, sucrose, Na₃Ct, H₂Asc, and cellulose nanocrystal. Each was added into its own falcon tube and add DI water until the sample had a final volume

of 10mL. The chitosan was prepared the same; however, upon reaching 10mL for a final volume, 0.017mL HCl was also added to the sample.

-Step 3: Place 1mg of NaBH₄ into 20mL ice cold DI water. This sample was not capped.

➤ AuNP for 100mM stock solutions preparation

-Step 1: Using each of the above reducing agent stock solutions, AuNP solutions were prepared according to the below equation. Note, each stock solution and subsequent solution from the equation was placed in its own test tube. This was completed for all stock solutions except for cellulose and NaBH₄. The cellulose was prepared according to step 2. The NaBH₄ was prepared according to step 3.

0.1mL 10mM HAuCl₄ + 0.1mL 100mM reducing agent stock solution + 3.8mL H₂O

-Step 2: The cellulose stock solution was added to the HAuCl₄ according to this formula.

0.1mL 10mM HAuCl₄ + 3.9mL cellulose solution

-Step 3: The NaBH₄ stock solution was added to the HAuCl₄ according to this formula.

0.2mL HAuCl₄ + 3.8mL NaBH₄

-Step 4: All of these prepared solutions were then placed into a water bath using a 600mL beaker at 80 degrees C for about 30 minutes.

-Step 5: UV/Vis was performed on these samples. The graphs produced are in figure 1.

Figure 1: UV/Vis for the AuNP and Reducing Agent Stock Solutions

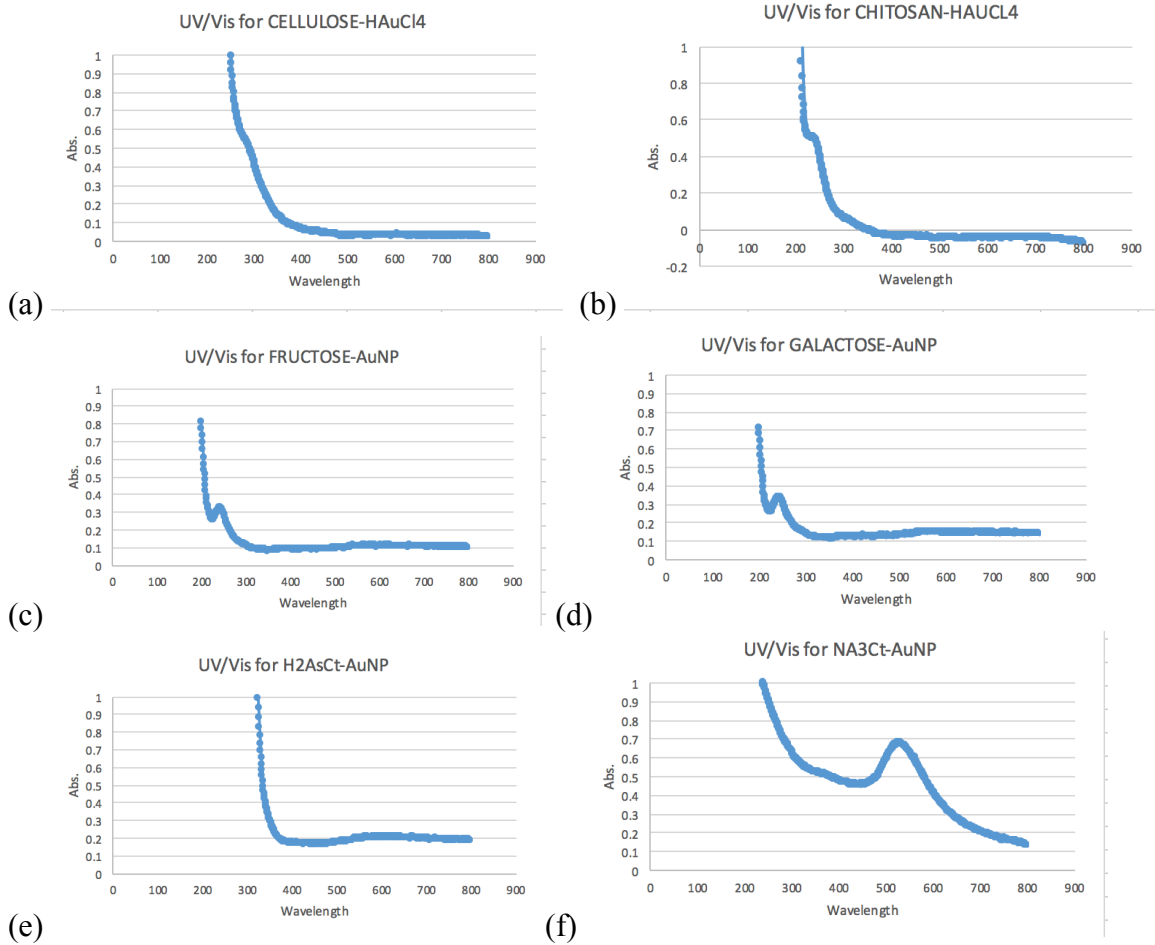


Figure 1 shows the UV/Vis graphs for the AuNP and reducing agent stock solutions. (a) shows the UV/Vis for the solution containing cellulose. There are no apparent peaks in this sample. (b) shows the UV/Vis for the solution containing chitosan. There are no apparent peaks in this sample. The absorption drops into the negative towards the end of the graph indicating error. (c) shows the UV/Vis for the solution containing fructose. There is a peak around 250nm. (d) shows the UV/Vis for the solution containing galactose. There is a peak around 250nm. (e) shows the UV/Vis for the sample containing H₂AsCt. There is a very slight peak at 600nm. (f) shows the UV/Vis for the sample containing Na₃Ct. There is a very steep peak around 550nm.