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IMPROVING THE PROPERTIES OF GUM ARABIC TO ACT AS SEMICONDUCTOR

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ABSTRACT

The preparation of Gum Arabic by iodine of different concentrations at room temperature) 25oC) and investigated the effect of vaccination of iodine on the distance between atoms and the angles between them using Easy Scan device. In addition of determination the absorption and energy gap of the treated samples using (UV-VIS) spectroscopy.

Keywords- *Gum Arabic, Hashab (regional plant), Taleh(regional Plant), acacia.*

I. INTRODUCTION

Gum Arabic is a natural polymer, play an important role in our daily life. It is one of the major exported goods from Sudan more than 67% of world product is from Sudan. Gum Arabic has many uses in food stuffs and an adhesive material due to its high viscosity and also used as an additive to make stable suspension mixture for medical surprise, lithography, textiles, paint, inks, and cosmetic. Gum Arabic is most important commercial poly- saccharine and it is probably the oldest food hydro-colloid in current use. Gum Arabic is high molecular weight polymeric compounds, composed mainly of carbon core mixed in heterogeneous manner, including some materials in tonic forms as salts of macromolecules have weak conductive properties {C^{+2}, Mg^{+2}, K^{+} } {FAO, 1990}.Gum Arabic is produced from many species of Acacia of African origin. Chemically, A. Senegal gum is an Arabian galactoy protein composed of arabinose {17-34%}, GA lactose {32- 50%}, rhamnose {n- 16%}, glue carbonic acid {3- 50%} and protein 1. 8-16%} with an optical rotation of {28° to 32°}.There are a lot of studies which are done in Gum Arabic but all of them are in normal uses in food stuff and adhesive material. So this study takes a different domain concerning new research in addition to identifying new application of Gum Arabic. This work is considered as conversion of (Arabic Gum) polymeric materials to become a good semiconductors material. In this work selecting Gum Arabic poultice Polymeric and added iodine where we reduced value of energy gap in semiconductors [1, 2, 3, 4, and 5].

II. EXPERIMENTAL SETUP

2.1 Instrumentation

Easy Scan is a device that is placed where the sample to be studied in form of tablets the device will scan them to clarify the order of atoms and the three –dimensional image in a vacuum where enables studied afterwards and completely new microscopy technique works without focusing elements and features atomic resolution (laterally and vertically). A small sharp platinum tip is scanned across the samples surface [6]. Ultraviolet _visible (UV-VIS) spectroscopy is used to obtain absorbance of a compound in solution. What is actually being observed spectroscopic all is the absorbance of light energy or electromagnetic radiation, which excites electrons from the ground state to the first singlet excite state of the compound material. The (UV_VIS) region of energy for the electromagnetic spectrum covers 1.5 -6.2 eV which relates to a wavelength rang of 800- 200nm. The Beer – Lambert law is the principle behind absorbance spectroscopy [7, 8, 9, and 10].

2-2 Samples Preparation

Dissolved samples of gum Arabic, lending in distilled water each of them separately and added to a solution of iodine in different concentrations and then placed in Petri dishes and left to dry [11, 12] and then form tables (1) and (2) and we got6samples of each type and put discs in the device Microscopy Easy Scan ,and read the results A length between the atoms and the angles between them show the results in fig (5) from Hashab and fig (6) Taleh. Were prepared iodine solution concentration 0.00421 M then three solutions were prepared for each of the gum

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Taleh and Hashab.
1. Add1gofgumto 20mlof distilled water
2.Add1gofgumto 25mlof distilled water
3.Add2gofgumto 20mlof distilled water
then add 1ml of iodine solution to each of the previous solutions samples were introduced to the UV –VES spectrometer device and took the results.

III. RESULTS & DISCUSSION

Was calculated distances between the atoms of the compounds of the process of grafting, Gum Arabic with iodine according to the samples that came from acacia and acacia and the results were as shown in the fig (1, 2, 3, 4 and 5) .

Table (1) Gum Taleh length between the atoms and the angles between them

consecration mg/L	Length between the atoms /nm	Angle between the atoms /degree
0.75	68.16	9.401
1	69.38	9.233
1.25	66.99	9.361
1.5	70.6	9.873
2	68.17	9.571
2.5	68.17	9.437

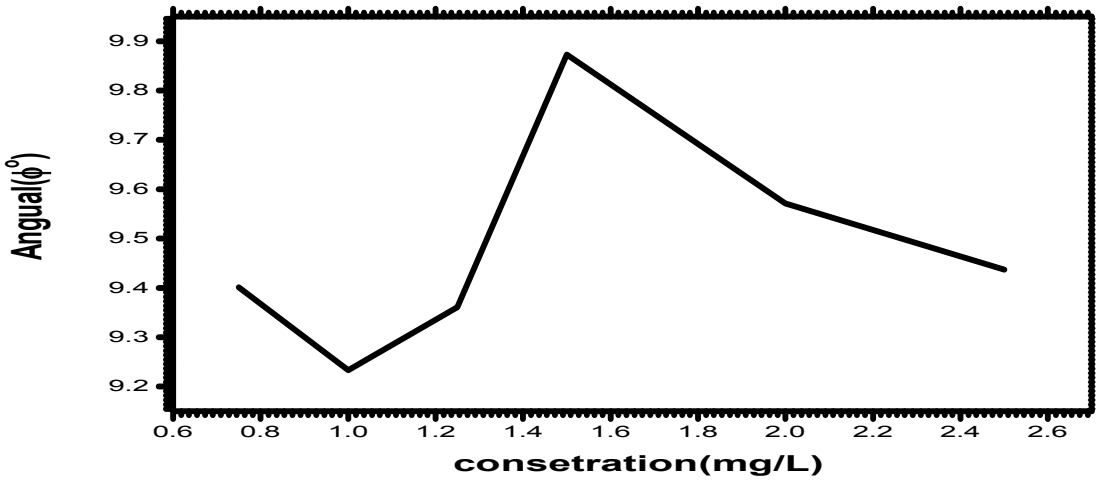

Fig (1) the relation sheep between the distances and concentrations in sample that mead from Gum Taleh

Table (2) Hashab gum length between the atoms and the angles between them

consecration mg/L	Length between the atoms /nm	Angle between the atoms /degree
0.75	65.72	8.588
1	66.94	9.176
1.25	68.17	9.276
1.5	68.16	8.701
2	68.17	7.368
2.5	69.38	9.399

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Fig (2) the relation sheep between the anglers and concentrations in sample that mead from Gum Taleh

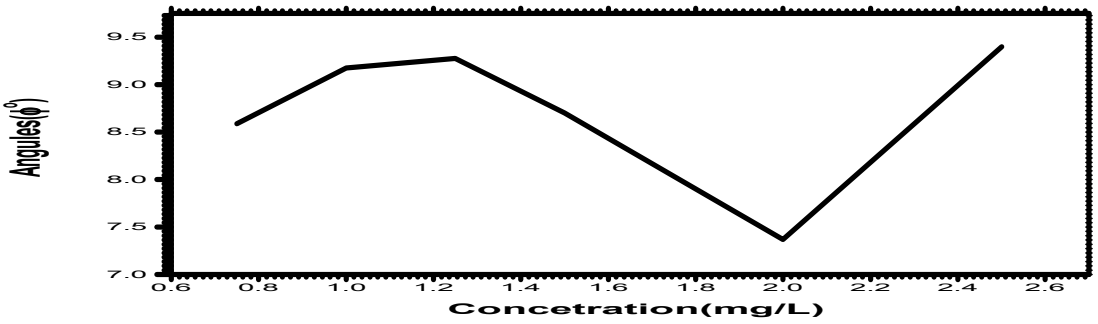
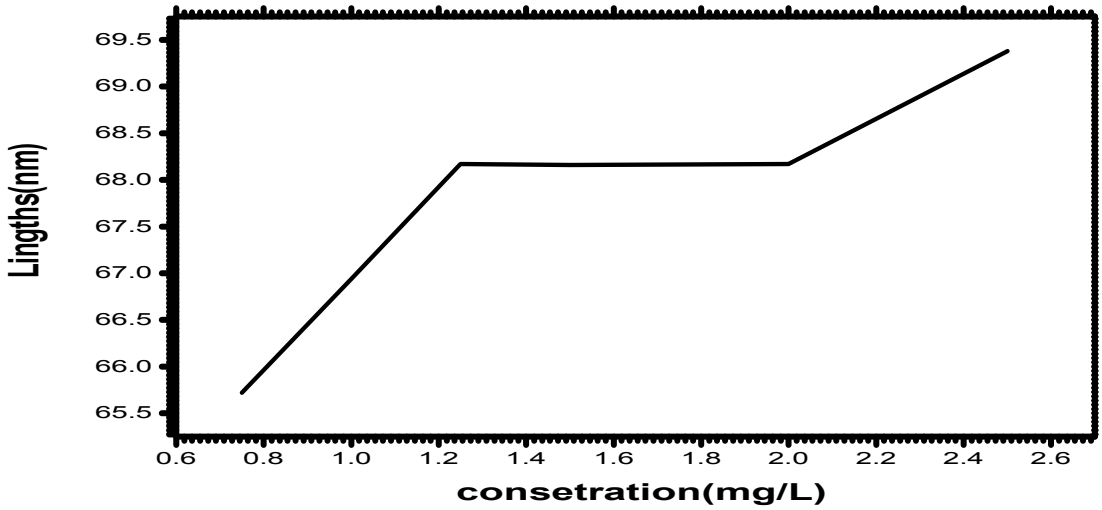
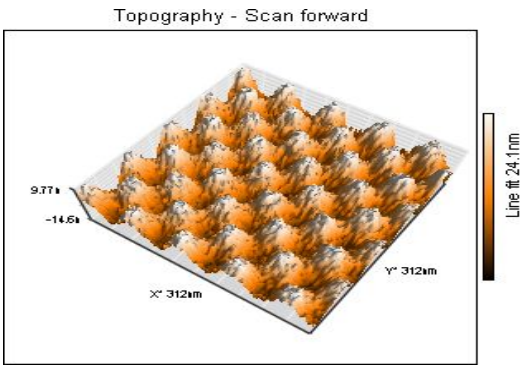


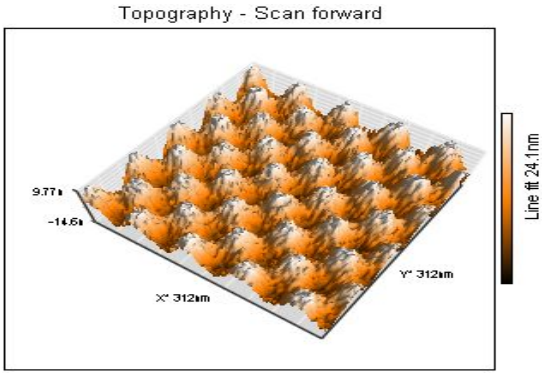
Fig (3) the relation sheep between the anglers and concentrations in sample that mead from Hashab gum

Fig (4) the relation sheep between the distances and concentrations in sample that Mead from Hashab Gum





A 1
B1



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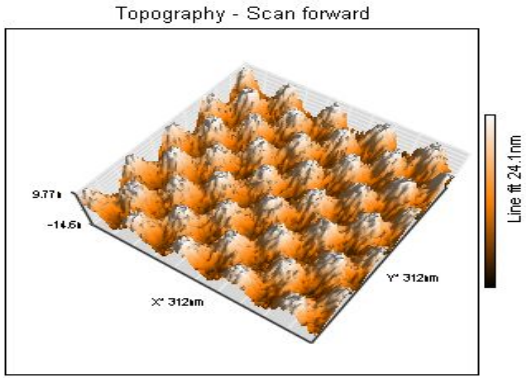

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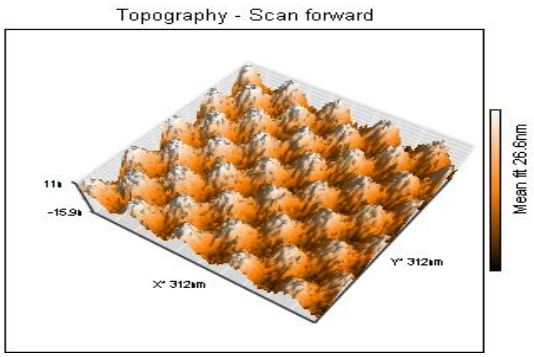

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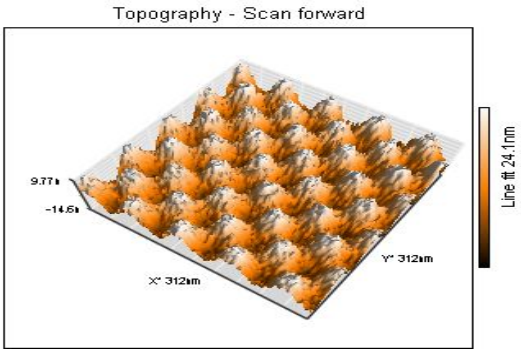
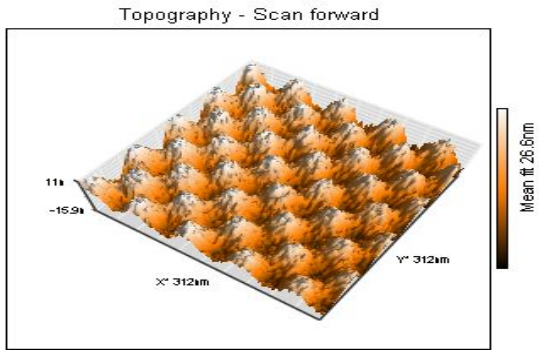
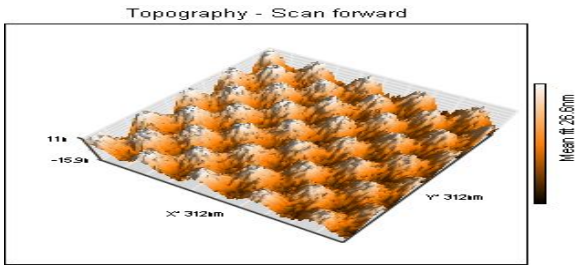


F 1

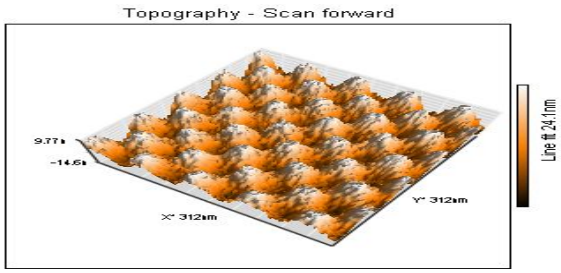


G1

Fig (5) shapes of molecule by Microscopy Easy Scan from the samples that mead from Gum Taleh



A2



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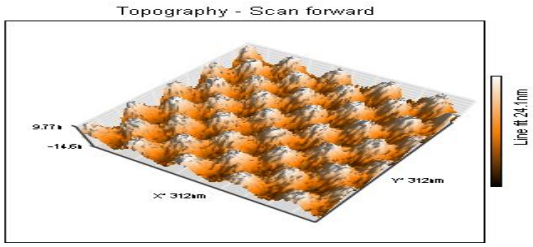

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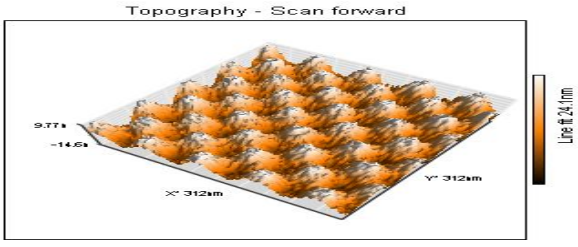

D2

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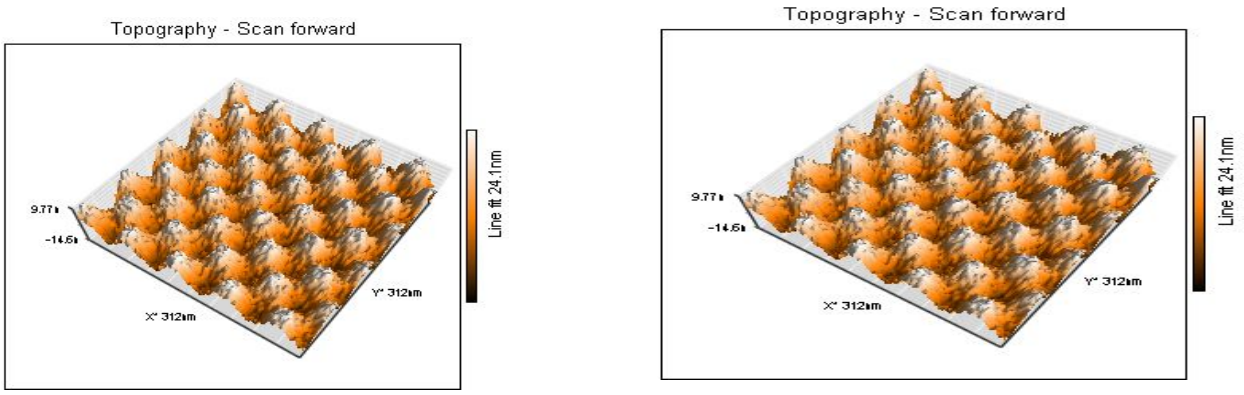

F2 **G2**

Fig (6) shapes of molecule by Microscopy Easy Scan from the samples that mead from Gum Hashab

The sample preparations described in the second phase concentrations in the table below the samples were placed in the UV –VES spectrometer device to see graphics below [10, 13, 14, and 15].

Table (2) showing the amount of samples

Name	Gum vol. (g)	Iodine vol.(ml)	DW Normal (ml)
T1	1	1	20
T2	1	1	25
T3	2	1	20
H1	1	1	20
H2	1	1	25
H3	2	1	20

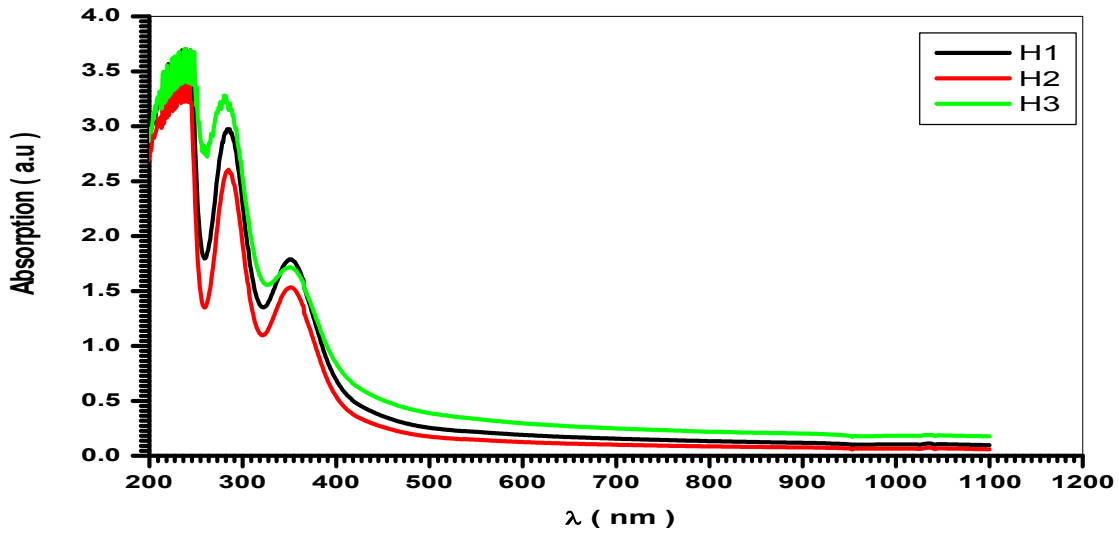

Figure (7) shows absorption of Hashab Gum as a function of wavelength for Acacia gum solution and iodine

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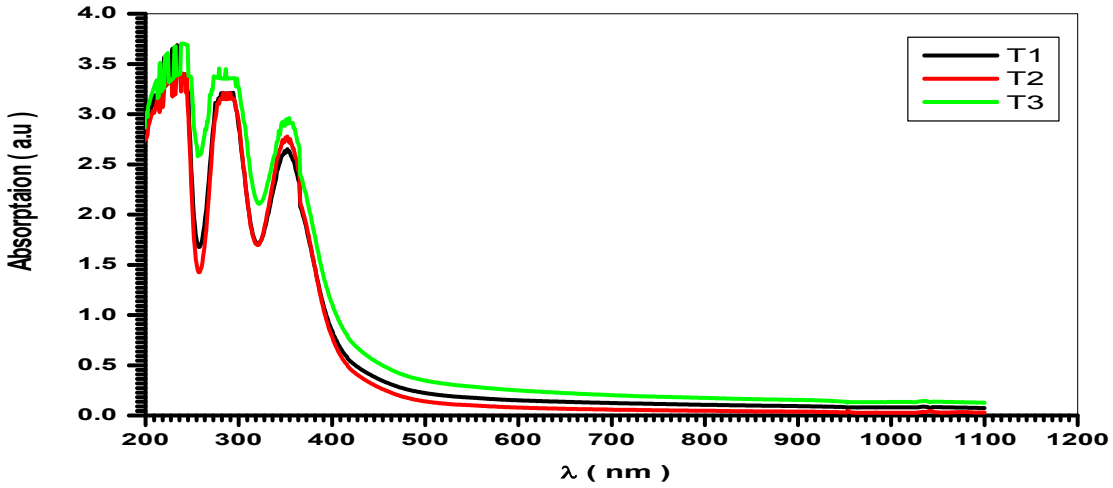

Figure (8) shows absorption of Taleh gum as a function of wavelength for Acacia gum solution and iodine

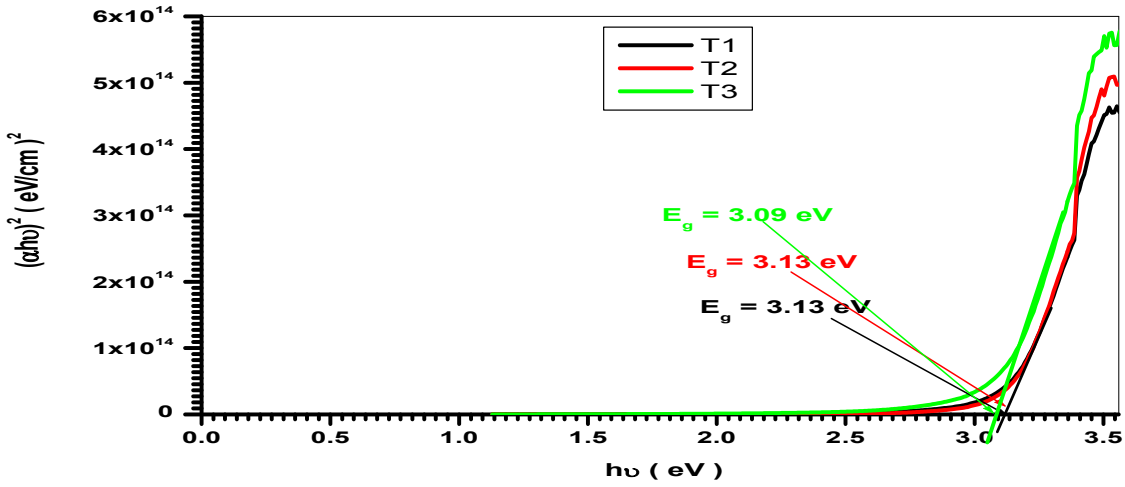

Figure (9) shows optical energy gap of Taleh gum

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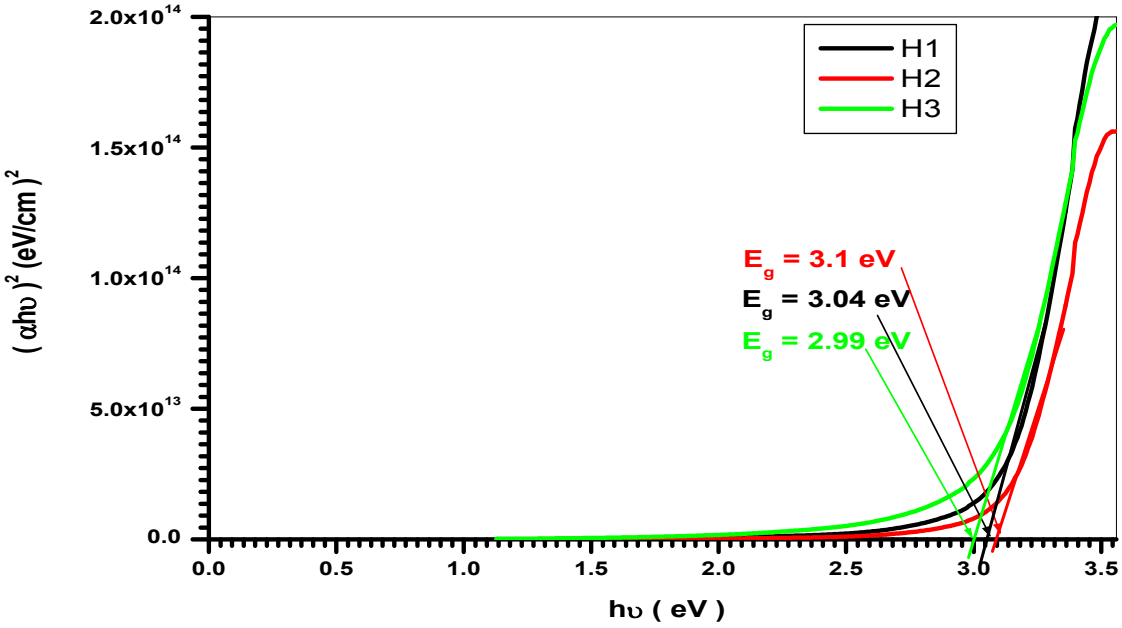

Figure (10) shows energy gap of Hashab gum

IV. ANALYSIS

- In fig (1) the study has these distances with the focus on the impact and created that gave Distance acacia samples ranging from 70 nm to 67nm until concentrations of 1.45mg / L for Distance 70nm and 1.22 mg / L for Distance 67nm But when the largest concentrations of 2mg / L, the distance was a constant and is 68.25nm
- In fig (2) study the effect of the focus on the angles between the nets of these compounds and found for samples Taleh reaching these angles values ranging from 9.8 to concentration of 1.4mg / L
- The total concentrations of at least 9.4 of 1mg / L Maid on irregular lattice her.
- In fig (3) the acacia samples, the distances between atoms ranging from 65.5nm to concentrations of at least 0.8mg / L He was found when the distance between the concentrations of 1mg / L and even 2mg / L and the amount of 68nm But at concentrations that are greater than 2mg / L became increase with the increase in concentration.
- In fig (4) when you study the effect of focusing on the corners in the corners samples Hashab be bigger than 9 concentrations of 1.2 mg / L And up to 7.5 at the higher concentrations 2mg / L and then increase the values of these angles increasing focus of the largest concentrations of 2mg / L which shows that the greater the concentration of atoms diverged from each other. Otherwise, the rest of the samples were almost similar to that, indicating that the samples Hashab Event where change an area that shows where the effect of concentration on the distance between atoms and also find that the angles between atoms sandwiched between 9.25Ountil 7.25O which shows that this on concentration of iodine in the gum Arabic affects the installation of substance, giving it special recipes

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V. CONCLUSION

Were prepared tablets of gum Arabic and iodine were introduced in easy scan device where it was knowing the distance and angles between the atoms in Gum Taleh highest Distance between atoms was 70.8 nm when the focus 1.52mg and what can be when the distance is less focus. 1.22mg / L In gum Hashab distance increases between atoms then be fixed between (1.2 - 2.0) mg / L where 68.3nm then begin increasing. The angles between atoms in Gum Taleh angles between the atoms of the biggest gum Hashab. Were prepared solutions of gum Arabic and iodine concentrations certain were studied gap energy and higher wavelength was him absorbency in Gum Taleh higher wavelength of absorbency is 360nm in gum Hashab 350nm and found that the gap energy affected by a concentration of gum in Gum Taleh when he was the focus of gum 1g was energy gap equal to 3.04 eV and when he was the focus of gum 2g was 3.09eV and when you add 5 ml of distilled water to the gum solution 1 g wigs affected by the energy gap. In Hashab gum when he was the focus of gum 1g was a gap energy 3.04eV When the concentration of gum 2g was energy gap 2.99V eV and when you add 5 ml of distilled water became energy gap 3.1eV where he greater the concentration of gum I said energy gap .

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