MgSnS Mg DOPPED SnS THINFILM PREPARED BY CHEMICAL BATH DEPOSITION.

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Abstract:

MgSnS Mg dopped SnS thin film are prepared by chemical both deposition to find out the thickness of UV and XRD analysis carry out. The thickness of the film found to be that 476nm. The plot of extinction αhν*αhν against the photon is as shown in figure.3. From the figure that there is gradually decreases in extinction co efficient with the increasing in the photon energy. Thus the XRD analysis of MgSnS film is shown figure.4. The XRD analysis reveals that the MgSnS thin film has hexagonal crystalline structure.

Key notes :

MgSnS Mg dopped SnS, thin film, thickness of UV and XRD.

Introduction :

Magnesium sulfide

Magnesium sulfide is Associate in Nursing compound with the formula MgS. it's a white crystalline material however usually is encountered in Associate in Nursing impure kind that's brown and non-crystalline powder. it's generated industrially within the production of auriferous iron.

Solubility in waterdecomposes

Crystal **structure**Halite (cubic), cF8

Space groupFm3m, No. 225

Magnesium Sulfide contains magnesium metal ion with Mg+2 charge thereon and nonmetal Sulfur anion with S−2 charge thereon. it's a blocky in nature crystalline structure that seems white to achromatic in color.

Chemical Formula: MgS

Molecular Weight: 56.365 g/mol

Chemical Name: Niningerite

Tin(II) sulfide:

Tin(II) compound is a chemical compound of tin and sulfur. The chemical formula is SnS. Tin(II) sulfide is a chemical compound of tin and sulfur. The formula is SnS. Its natural incidence considerations herzenbergite (α-SnS), a rare mineral. At elevated temperatures on top of 905 K, SnS undergoes a second order natural process natural process (space group: Cmcm, No. 63).[3] in recent years, it's become evident that a replacement organism of SnS exists primarily based upon the solid crystal system, called π-SnS (space group: P213, No. 198).[4][5] PROPERTIES : Tin(II) compound could be a dark brown or black solid, insoluble in water, however soluble in concentrated hydrochloric acid. Tin (II) compound is insoluble in (NH4)2S. it's a layer structure just like that of black phosphorus.[6] As per black phosphorus, tin(II) compound will be ultrasonically exfoliated in liquids to provide atomically skinny semiconductive SnS sheets that have a wider optical band gap (>1.5 eV) compared to the majority crystal.[7]

EXPERIMENTAL TECHNIQUE:

The surface to that the skinny film is deposited in termed is substrate. The surface of the substrate ought to be flat and swish to create films. It is a mechanical support for the skinny film associated in electronic application it conjointly is an stuff. the requirement for future stability makes it imperative that no modification|chemical action} occur that wolud change the properties of the film. It ought to have associate applicable heat conduction to make sure constant temperature of the surface operation of electronic devices. Substrate material : A number of materials like glasses, ceramics and quartz ar obtainable to be used as skinny substrate materials
same concerning has the utmost surface smoothness and is additionally optically plane. it's esily and cheaply obtainable. For the current work, the substrate used is " Glass". Substrate cleansing : The substrate is initial totally clean to get rid of contaminants. The cleansing method adopted depends on the choice of the substrate. This info offers the influence of the substrate cleansing on the adherence, temperature, stability, resistance to radiation contaminants like like resides, finger prints, oil and mobile particulate material while not damaging the substrate.

First of the the glass substrate is cleansing with soap resolution then rinsed H2O. once more the substrate ar cleansing with water and resolvent rinsed with H2O and allowed to dry. cleansing with resolvent removes unwanted fatty material deposition on the substrate before coating. when cleansing the substrate it's hold on during a mud free atmosphere till prepared to be used. thus cleansing is important for the preparation films with consistent properties.

Methods of deposition :

1. Ordinary dipping methodology (or) resolution growth methodology.
2. Controlled dipping methodology. Solution growth method:

The resolution growth of deposition of this compound films involves simmersion of a substrate into compound solution of an appropriate concentration. Increasing theamount of dipping increase the thickness of the film. One aspect film should be wiped by resolvent. this can be done to avoid the variation in optical parameter of the film.

Controlled dipping methodology : In this method of deposition the strategy of dipping is controlled by stepper motor interfaced to silicon chip. the peak of the coating depends on the machine size used and therefore the management of dipping depends on the speed of motor.

Coating materials:

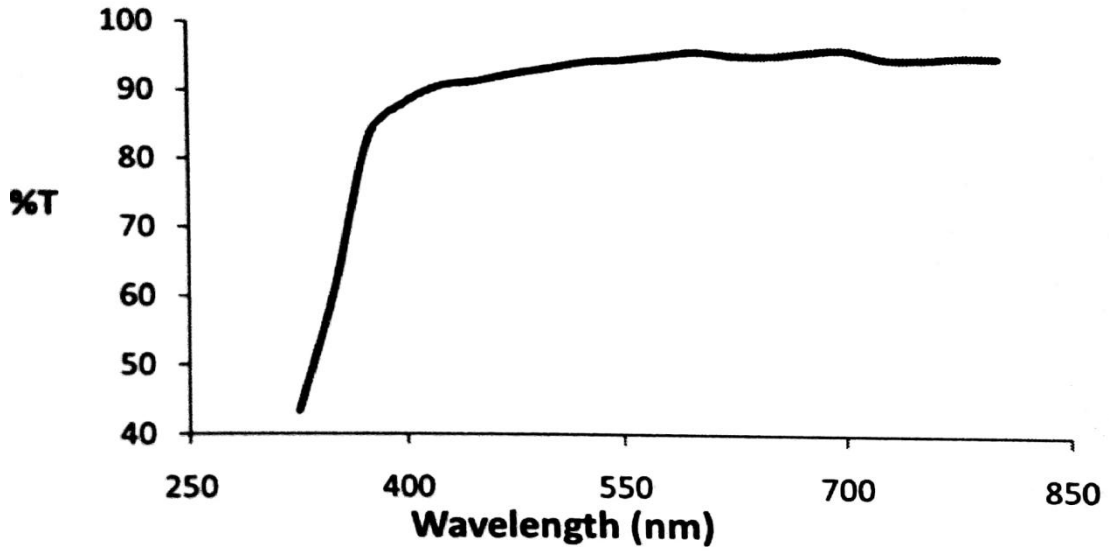
Film : the layer of the materials on the substrate is thought as film. so as to organize the film, the materials most well-liked for the current ar MgSnS dopped on skinny film

1. CH4N2S
2. 2.Sn2
3. 3.NaOH
4. 4.Mgcl2

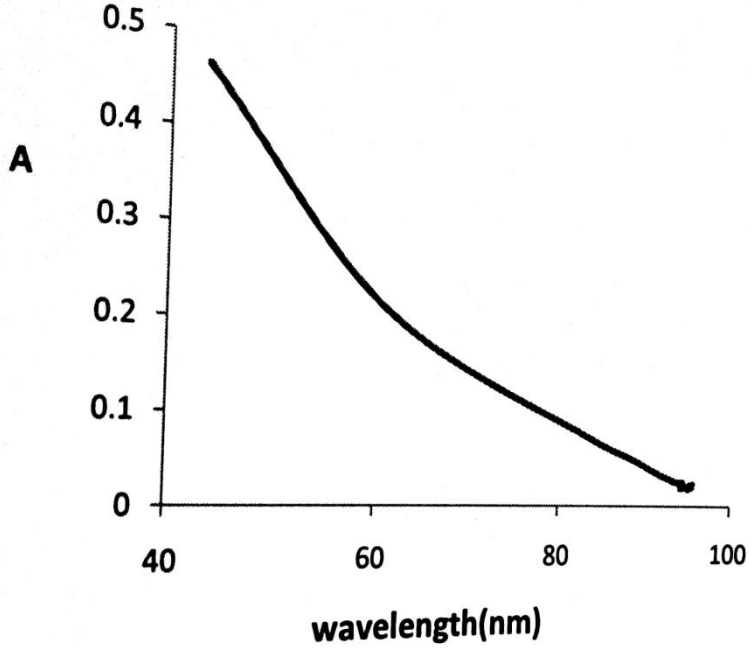
ULTRA VIOLET :

UV chemical analysis is style of absorption chemical analysis within which of extremist - violet (200 - 400nm) is absorbed by the molecule. Absorption of the ultr - violet radiations check within the excitation of the electrons from the bottom state to higher thvioletradi absorb adequate the energy distinction between the bottom state to higher energy level. typically the foremost favored transition is type the best occupied molecular orbital (HOMO) to lowest unoccupiedmolecular orbital ar s orbitals, that correspond to letter of the alphabet bonds. The p orbital ar at some what higher energy levels. The unoccupied or anti bonding orbitals (pie and letter of the alphabet) ar the best energy occupied orbitals is that the compounds.

wavelength	% T
350	61
375	83.4
400	88.4
425	90.9
450	91.6
475	92.6
500	93.4
525	94.3
550	94.5
575	95
600	95.5
625	94.9
650	94.8
675	95.3
700	95.5
725	94.2
750	94.1
775	94.4
800	94.3

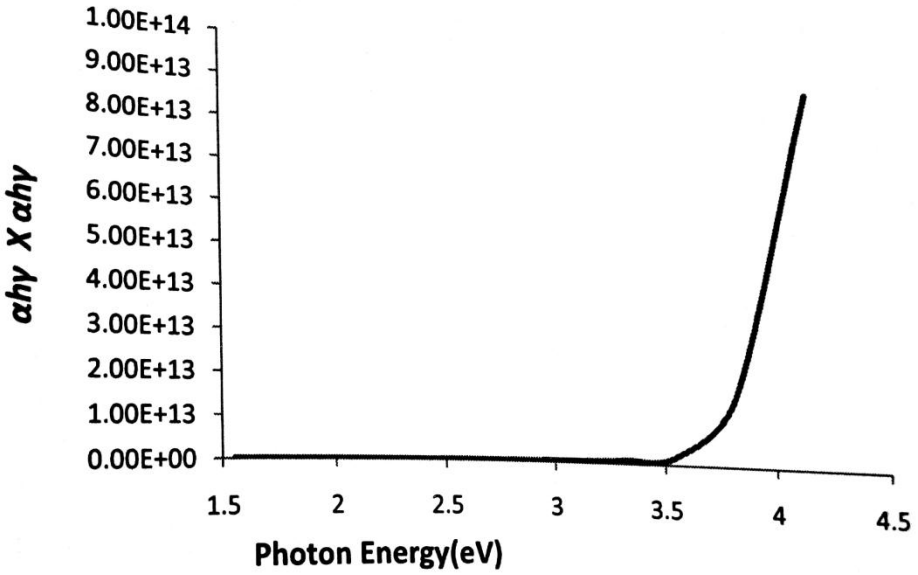


% T	A
43.3	0.467
61	0.22
83.4	0.081
88.4	0.056
90.9	0.042
91.6	0.038
92.6	0.034
93.4	0.03
94.3	0.028
94.5	0.024
95	0.021
95.5	0.024
94.9	0.022
94.8	0.022
95.3	0.024
95.5	0.027
94.2	0.022
94.1	0.023
94.4	0.029
94.3	0.028
94	0.028



ENERGY	αhγ * αhγ
4.14	8.76E +13
3.82	1.66E +13
3.55	1.94E +12
3.31	8.07E +11
3.11	3.99 E +11
2.92	2.89 E +11
2.76	2.06E +11
2.62	1.44 E +11
2.49	1.13 E +11
2.37	7.56 E +10
2.26	5.27 E +10
2.16	6.3 E +10
2.07	4.86 E +10
1.9	4.48 E +10
1.91	4.93 E +10
1.84	5.79 E +10
1.66	3.57 E +10

1.6	3.64 E +10
1.55	5.41 E +10



Result and discussion :

The Mgcl2 thin film is deposited on a glass substrate using chemical bath deposition method at 40ºC in 3 hours. The various characterization techniques searches UV and XRD. Figure .1 shows that the plotting of the transmittance against the various wavelength in the range between 300 nm to 800 nm. The transmittance lies under 85% shown in figure.1 for the different wavelength. The optical band gap energy is obtain from the plot of (αhν)2 against the photon energies shown in figure 2.where α is absorption which is calculated from the wavelength data. The optical band gap energy of the MgSnS thin film is found to be 3.5 ev as shown in figure.3 by drawing a straight from the curve to the X - axis (photon energy). The thickness of the film found to be that 476nm. The plot of extinction αhν*αhν against the photon is as shown in figure.3. From the figure that there is gradually decreases in extinction co efficient with the increasing in the photon energy. Thus the XRD analysis of MgSnS film is shown figure.4. The XRD analysis reveals that the MgSnS thin film has hexagonal crystalline structure. This analysis also showsthat the MgSnS film on the substrate this amorphous are cinsists of small grains. It is found that the MgSnS film deposited on the substrate has poor space crystallinity. However the MgSnS film is microcrystalline and it consists of mixed phases β (cubic) and ν (hexogonal).

Conclusion:

Synthesization of MgSnS thin film has done by using glass substrate by chemical bath method (CBD). It has cost consu,ption, easy construction and uniform coating materials. The temperature is kept at 40ºC throughout the deposition process of 4 hours. The linear nature of absorption indicates that MgSnS is a direct band gap

material with the band gap energy equal to 3.5 ev. The XRD image of the MgSnS thin film gives the information about the crystalline structure prepared thin film. Itconfirms that the film has hexagonal crystalline structure. It also shows that the film is a amorphous. This MgSnS film can be also used as the UV reflectors and also the CDS ZN thin film has been used as various detectors, optical mirrors, LCD, LED. It can be also us ein decorative coating.

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