مجلة القُلزم العلمية

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موجهات النشر

تعريف المجلة:

مجلة (القُلزم) للدراسات العلمية مجلة علمية محُكمة تصدر عن مركز بحوث ودراسات دول حوض البحر الأحمر - السودان، بالشراكة مع أكاديمية المنهل للعلوم - السودان. تهتم المجلة بالبحوث والدراسات العلمية والمواضيع ذات الصلة بدول حوض البحر الأحمر.

موجهات المجلة:

1. يجب أن يتسم البحث بالجودة والأصالة، وألا يكون قد سبق نشره قبل ذلك.
2. على الباحث أن يقدم بحثه من نسختين. وأن يكون بخط (Traditional Arabic) بحجم 14 على أن تكون الجداول مرقمة وفي نهاية البحث وقبل المراجع على أن يشار إلى رقم الجدول بين قوسين دائريين ().
3. يجب ترقيم جميع الصفحات تسلسلياً وبالأرقام العربية بما في ذلك الجداول والأشكال التي تلحق بالبحث.
4. المصادر والمراجع الحديثة يستخدم أسم المؤلف، اسم الكتاب، رقم الطبعة، مكان الطبع، تاريخ الطبع، رقم الصفحة.
5. المصادر الأجنبية يستخدم اسم العائلة (Hill, R).
6. يجب ألا يزيد البحث عن 30 صفحة، وبالإمكان كتابته باللغة العربية أو الإنجليزية.
7. يجب أن يكون هناك مستخلص لكل بحث باللغتين العربية والإنجليزية على ألا يزيد على 200 كلمة بالنسبة للغة الإنجليزية. أما بالنسبة للغة العربية فيجب أن يكون المستخلص وافياً للبحث بما في ذلك طريقة البحث والنتائج والاستنتاجات، مما يساعد القارئ العربي على استيعاب موضوع البحث وبما لا يزيد عن 300 كلمة.
8. لا تلزم هيئة تحرير المجلة بإعادة الأوراق التي لم يتم قبولها للنشر.
9. على الباحث إرفاق عنوانه كاملاً مع الورقة المقدمة (الاسم رباعي، مكان العمل، الهاتف، البريد الإلكتروني).

نأمل قراءة شروط النشر قبل الشروع في إعداد الورقة العلمية.

بسم الله الرحمن الرحيم

كلمة التحرير

الحمد لله رب العالمين، والصلاة والسلام على سيدنا محمد وعلى آله وصحبه أجمعين

وبعد:

القارئ الكريم ،،،

السلام عليك ورحمة الله وبركاته.. نطل على حضراتكم من نافذة جديدة من نوافذ النشر العلمي وهي مجلة القلزم العلمية، ونحن في غاية السعادة والمجلة تصل عددها الثامن والثلاثون بفضل الله تعالى ومنته.

القارئ الكريم:

هذه المجلة تصدر بالشراكة مع أكاديمية المنهل للعلوم وهي إحدى الأكاديميات السودانية الفنية التي وضعت بصمات مميزة في مسيرة البحث العلمي، وهذا العدد هو الثامن والثلاثون في إطار هذه الشراكة العلمية التي تأتي في إطار استراتيجية مركز بحوث ودراسات دول حوض البحر الأحمر في تفعيل الحراك العلمي والبحث داخل السودان وخارجه..

القارئ الكريم:

هذا العدد يشتمل على عدد من البحوث والدراسات المهمة ذات البعد النظري والتطبيقي ولضمان نجاح واستمرارية هذه المجلة بإذن الله تعالى نأمل أن يرفدنا الباحثون بمزيد من اسهاماتهم العلمية المميزة مع خالص الشكر والتقدير للجميع..

أسرة التحرير

المحتويات

Studying some Optical Properties of Titanium Oxide Compound doped with Lead Oxide by using an Ultraviolet Spectrometer

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Abstract:

This research dealt with studying some of the optical properties of the titanium Oxide compound doped with lead oxide. This study was conducted in the laboratories of the Laser Department, Faculty of Science and Technology, Al-Neelain University, Sudan, during 2022. The study aimed to know the titanium Oxide compound doped with lead oxide and to study some of its optical properties (absorption, transmittance, reflection coefficient, absorption coefficient and the extinction coefficient), five samples were prepared : With different concentrations of titanium Oxide compound doped with lead oxide based on the following equation: , an ultraviolet spectrometer was used to find the optical properties. The samples were analyzed using the American program Organ, version 8.6, for calculations and statistical analyses. The study found the following results: For the five samples, the rapid increase in absorption at wavelengths of 290 nm was found to have across-photon energy of 4.28 ev. The effect of the molar percentage of (Pb_{1-x}) on the absorbance value led to an increase in the absorbance value of (Pb_{1-x}), while in transmittance we notice a rapid decrease in transmission at wavelengths of 290 nm. The effect of the

molar percentage of (Pb_{1-x}) on the transfer value was incomplete for (Pb_{1-x}) on the decrease in the transfer value, While we find in the reflection coefficient that the maximum reflection is observed in the range (250 to 330) nm for all samples in this range, the samples are mirror, then it decreases beyond 330 nm, and we find the absorption coefficient obtained that the value of $\alpha = 0.459 \times 10^3$ cm^{-1} for the sample. ($Ti_{0.1}$ $Pb_{0.9}$ O_3) in the ultraviolet region (290 nm). As for the ($Ti_{0.9}$ $Pb_{0.1}$ O_3) sample, which is equal to 0.257×10^3 cm^{-1}, this means that the transition must correspond to a non-electronic transition. Direct transfer, and the characteristics of this state are important because it is responsible for electrical conduction, The extinction coefficient (K) was obtained at the wavelength (290 nm) based on the sample processing method, where the value of (K) at 290 nm for the sample ratio ($Ti_{0.1}$ $Pb_{0.9}$ O_3) was equal to 1.08×10^{-3} cm^{-1}, while for the other sample ($Ti_{0.9}$ $Pb_{0.1}$ O_3) vibrates at a certain wavelength equal to 6.05×10^{-4} cm^{-1} , The effect of (Pb 1-x) on the extinction coefficient (Pb 1-x) was increased and then the extinction coefficient (k) was increased, This study recommends further investigation of the optical properties of different compounds.

Key words: titanium Oxide, lead oxide, absorption, transmittance, reflection coefficient, absorption coefficient and the extinction coefficient.

دراسة بعض الخواص البصرية لمركب أكسيد التيتانيوم المشوب بأكسيد الرصاص باستخدام مطياف الأشعة فوق البنفسجية

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المستلخص:

تناول هذا البحث دراسة بعض الخواص البصرية لمركب أكسيد التيتانيوم المطعم بأكسيد الرصاص، أجريت هذه الدراسة في مختبرات قسم الليزر بكلية العلوم والتكنولوجيا جامعة النيلين بالسودان خلال العام 2022م، هدفت الدراسة لمعرفة مركب أكسيد التيتانيوم المطعم بأكسيد الرصاص ودراسة بعض الخواص البصرية له (الامتصاصية، النفاذية، معامل الإنعكاس، معامل الإمتصاص ومعامل الإخماد)، حُضرت عدد خمس عينات: بتراكيز مختلفة من مركب أكسيد التيتانيوم المطعم بأكسيد الرصاص إعتماداً على المعادلة التالية: ، أُستخدم جهاز مطيافية الأشعة فوق البنفسجية لإيجاد الخواص البصرية، حُللت العينات باستخدام البرنامج الأمريكي الأورجن إصدار 8.6 للحسابات والتحليلات الإحصائية، توصلت الدراسة للنتائج التالية للخمس عينات، وُجد أن الزيادة السريعة في الامتصاص عند الأطوال الموجية 290 نانومتر طاقة الفوتون المتقاطعة 4.28 فولت. تأثير النسبة المئوية للمولاري ل (Pb 1-x) في قيمة الامتصاصية أدى إلى زيادة قيمة الامتصاصية لـ (Pb 1-x)، أما في النفاذية نلاحظ الانخفاض السريع في الإرسال عند الأطوال الموجية 290 نانومتر. تأثير النسبة المئوية المولارية لـ (Pb 1-x) في قيمة النقل كانت ناقصة لـ (Pb 1-x) في انخفاض قيمة النقل، بينما نجد في معامل الإنعكاس أن أقصى انعكاس لوحظ عند المدى (250 إلى 330) نانومتر لجميع العينات في هذا النطاق تكون العينات مرآة، ثم ينخفض إلى ما بعد 330 نانومتر، ونجد معامل الإمتصاص حصلت على أن قيمة $\alpha = 0.459x103\ cm^{-1}$ بالنسبة لعينة (Ti0.1 Pb0.9 O3) في منطقة الأشعة فوق البنفسجية (290 نانومتر) أما بالنسبة لعينة (Ti0.9 Pb0.1 O3) التي تساوي 0.257×103 سم1- فإن هذا يعني أن التحول يجب أن يتوافق مع انتقال إلكتروني غير مباشر الانتقال، وخصائص هذه الحالة مهمة لأنها مسؤولة عن التوصيل الكهربائي، تم الحصول على معامل الإخماد (K) عند الطول الموجي (290 نانو متر) بالاعتماد على طريقة معالجة

العينـات، حيـث بلغـت قيمـة (K) عنـد 290 نانـو مـتر لنسـبة العينـة (Ti0.1 Pb0.9 O3) تسـاوي3-x10 1.08 سـم1- بينـما بالنسـبة للعينة الأخـرى (Ti0.9 Pb0.1 O3) تهتز عند طول موجي معين يسـاوي4-x10 6.05 سـم1- ، تـم زيـادة تأثـير (Pb 1-x) عـلى معامـل الإخـماد (Pb 1-x) ثـم زيادة معامل الإخـماد (k)، تُـوصي هـذه الدراسـة بإجـراء مزيـد من الخـواص البصريـة لمركبـات مختلفة.

1. Introduction:

1.1. Titanium:

Titanium is a chemical element with the symbol Ti and an atomic number of 22. It belongs to the d-level elements and is located at the top of the fourth group elements in the periodic table. It is a transition metal. Titanium is a shiny, silver- coloured metal. It is light, durable and resistant to corrosion even in extreme conditions, such as in sea water, aqua regia and chlorine, for example.

William Greg or discovered this element at a site in the British county of Cornwall, and Martin Clap rot named it “titanium,” after the Titan, a race of gods according to Greek mythology. Titanium is found in a group of minerals, especially rutile and ilmenite, which are widespread in the Earth’s crust and the Earth’s lithosphere. Titanium is extracted from its ores using the Kroll and Hunter processes. Titanium has a number of chemical compounds, the most famous of which is titanium dioxide, which is widely used in various applications, such as the manufacture of white clay.

Titanium can be alloyed with a number of other metals, such as iron, aluminum, vanadium and molybdenum, for example. Titanium alloys have a large number of important applications in various fields, such as the aviation and space industry, the chemical and military industries, and the automotive industry, as well as in the medical field, especially in the field of prosthetics and bone implants.

The discovery of titanium dates back to the year 1791, when the cleric and amateur geologist William Greg or [1] found the inclusion of this metal within a mineral sample from the British county of Cornwall. The scientist Greg was able to distinguish the presence of a new element in the mineral ilmenite,[2] when he found the ash. In this sample, notice that it is attracted to the magnet. By conducting additional analysis, Greg or confirmed the presence of two metal oxides. He was able to distinguish one of them, which was iron oxide. As for the other white oxide, he could not attribute it to a known metal at that time. So he began to write to the Royal Society. Geological Survey in Cornwall in addition to a German scientific journal specializing in chemistry [2,3,4].

After that, and in a similar historical period, Franz Joseph Müller von Reichenstein was able to obtain a substance similar to the oxide, but he was unable to determine its composition [2]. Then in the year 1795, independently, Martin Klaprot [4] was able to obtain the oxide In a sample of rutile brought from Central Europe, confirming the discovery of the new element, which was called “titanium.” [5].

1.2. Lead:

Lead is a chemical element with the symbol Pb and an atomic number of 82.It is located in the periodic table within the carbon group (group fourteen; it is also the fourth group according to the numbering of the main groups). Lead is a heavy metal with a high density. It is normally found in a bluish-silver color, which quickly loses its luster to a dark gray color when exposed to air. Lead is included in the composition of a number of alloys, and it is also a soft, malleable metal that can be drawn and malleable. It is also a stable metal, and three of its isotopes are at the end of the decay chain of radioactive heavy elements.

Lead is chemically classified as a post-transition metal (weak metal), and this characteristic is evident in its oscillatory nature. Lead and its oxide react with acids and bases. There is also a difference in the character of its chemical compounds depending on the oxidation state. Lead(II) compounds have an ionic character, while lead quaternary compounds have a predominantly covalent character, as is the case with organic lead compounds.

Lead is one of the oldest metals used in human history. In addition to arsenic and antimony, it was one of the metals that were experimented with in the First Bronze Age in order to prepare bronze, until tin was discovered. Pieces of metallic lead dating back to about 7000 BC were found in the Anatolian region near Çatalhöyük, and they represent the oldest historical finds that were processed by smelting. At that time, lead had no known application due to its softness and dull appearance [8]. This was the main factor The spread of its extraction is its accompaniment to silver in ores in the earth's crust[9].

The Egyptians used lead in cosmetics, an application that later spread to the ancient Greeks and other civilizations. [10] In addition, it is likely that the ancient Egyptians also used lead in weighing fishing nets, in the manufacture of glass and glazed enamel, as well as in the manufacture of Ornamental purposes: Several civilizations in the Fertile Crescent region used lead in a number of different applications, such as its use in writing, minting currency, and as building materials. [9] As for the Near East, the ancient Chinese used lead as a means of birth control[10] as well as in minting coins;[11] In contrast, lead was used in the manufacture of amulets in the Indus Valley and Central American civilizations[9] while the peoples of Eastern and Southern Africa I used it to pull wires [12].

2. Theoretical background:

2.1. Optical Properties:

2.1.1. Absorbance:

“Absorbance is the logarithm of the ratio of incident rays to the radiant energy transmitted through a sample (excluding effects on cell walls).”[13] Alternatively, for samples that scatter light, absorbance can be defined as “the negative logarithm of one minus the absorption coefficient, “as measured on the uniform sample”[14]. This term is used in many technical fields to define the results of an experimental measurement. While the term has its origins in quantifying the light absorption coefficient, it is often intertwined with measuring the amount of light that is “lost” to a system Detector through other mechanisms. These uses of the term refer to the logarithm of the ratio of the amount of light falling on a sample or material to that which is detected after the light interacts with the sample.

The term absorption coefficient refers to the physical process of absorbing light, while absorption coefficient does not always measure only the amount of absorption; It may measure attenuation (of transmitted radiant energy) resulting from absorption, as well as reflection, scattering, and other physical processes. Sometimes the term “attenuation” or “empirical absorption” is used to emphasize the loss of radiation from the beam by processes other than absorption, while the term “internal absorption” is used to confirm that the necessary corrections have been made to eliminate the effects of radiation and phenomena other than absorption.[15]].

2.1.2. Transmittance:

Transmittance is the passage of a portion of the incident light ray with a specific wavelength through the sample. This occurs if the sample is transparent, and usually a portion of it is lost in the material sample due to its absorption

in the sample. It gradually weakens, and the portion that was not absorbed comes out of the sample. This is why the concept of transmittance is linked to the concept of absorption, and absorption [16] is the sample's absorption of a portion of the incident light beam at a specific wavelength. The terms "visible transmittance" and "visible absorption" may also be mentioned, which express specific parts of the spectrum in the so-called visible spectrum.

This phenomenon also occurs in the permeability of seawater to light. The intensity of light decreases as depth in the water increases - due to the water gradually absorbing light. Even to deep depths, the water is completely dark and the sun's rays do not reach it.

2.1.3. Reflection:

Light is reflected either specular (mirror-like) or diffuse (retains energy, but loses image), depending on the nature of the brightness. In specular reflection, the reflected waves depend on the choice of coordinate origin, but the relative phase between the s and p polarizations (TE and TM) is determined by the properties of the media and the surface between them.[17] .

When light strikes the surface of a (non-metallic) material, it bounces in all directions due to multiple reflections resulting from microscopic irregularities within the material in question (such as a polycrystalline material, or cell boundaries or fibers in an organic material). Thus, the "image" is not formed. This is called diffuse reflection. The exact form of the reflection depends on the structure of the material. A common model of diffuse reflection is Lambertian reflection, in which light is reflected with the same luminance (in photometry) or radiance (in radiometry) in all directions, as physically defined by Lambert's law.

We find that the light sent by most objects we see to our eyes is due to diffuse reflection from the surface, so this is our primary mechanism for physical observation [18].

2.1.4. Absorption coefficient:

Absorption coefficient or attenuation coefficient in chemistry and physics is a value that determines the transmittance of light in a material, the transmittance of sound in a material, or the transmittance of a particle in a material. A large absorption coefficient means to us that the ray that penetrates the material is weakened, because it permeates the material, and a small absorption coefficient means that the material is transparent to the ray that passes through it.

Absorption concept:

Light absorption is the process in which light is absorbed by a substance and then converted into energy, as the electrons in the atom vibrate at a certain frequency, or what is called the natural frequency. If a wave of light collides with a substance, the electrons in this substance vibrate at the same frequency as the light wave. Thus, the electrons absorb energy and convert it into vibrating motion. Objects have different colors, as the electrons of different materials will vibrate at different rates, and thus absorb different frequencies of light [19].

Measurement of light absorption:

Light absorption of semi-transparent media is measured using the absorption coefficient, which expresses the parts of light energy that are lost per unit length, where the absorption length is expressed by the term inverse of the absorption coefficient, and if it is discovered that the amount The measured light absorption may be due to the absorption of light by some impurity, and the contribution of each atom or ion to the absorption is often quantified through an absorption cross section[20].

2.1.5. Extinction coefficient:

The extinction coefficient is the degree of absorption of light by a measured solution. When the concentration of the solution is high, this results in a darker color after color development. There is obvious absorption of light and leads to a decrease in light transmission. At low concentrations and light colors, the absorption of light is diminished, resulting in As the light transmittance increases for a given solution, it shows characteristic absorption peaks for light of different wavelengths.

To enhance sensitivity, it is usual to choose the complementary color of light as the preferred wavelength. For example: blue and yellow are complementary colors. The wavelength of 595 nm falls within this range, resulting in maximum absorption value and thus enhanced sensitivity. The wavelength of 465 nm corresponds to Celestial light, and since blue solutions show less absorption at this wavelength, sensitivity is proportionally diminished.

In many applications involving peptides or proteins, we find amino acids that contain aromatic side chains, namely tyrosine, tryptophan, and phenylalanine, which show strong absorption of ultraviolet light. Therefore, the absorption of ultraviolet light by proteins and peptides is directly proportional to the aromatic amino acid content and the total concentration. . Once the specific absorption coefficient of a particular protein is determined, which is determined by its fixed amino acid composition, the concentration of the protein in solution can be calculated from its absorption.

For most proteins, absorption of ultraviolet light allows detection at concentrations as low as 100 µg/mL. However in the case of complex protein solutions, such as cell lysates, estimation of protein concentration by UV absorption is not accurate due to the apparent structure of proteins with different absorption coefficients. In addition proteins are not the only molecules capable of absorbing UV radiation; Complex solutions often contain

compounds such as nucleic acids that can interfere with the determination of protein concentration using this method.

However, for protein aqueous solutions commonly used in research laboratory settings, interference from other compounds can be reduced by measuring absorbance at 280 nm.

Only tryptophan (Trp, W) and tyrosine (Tyr, Y), along with a smaller amount of cysteine (Cys, C), contribute significantly to the absorption of peptides or proteins at 280 nm. Phenylalanine (Phe,F) shows absorption mainly at low wavelengths (240-265 nm) [21,22,23,24,25].

3. Research problem:

We note that there are many studies to find that the optical properties are always in one material, so this study resorted to finding out the optical properties of the titanium oxide compound doped with lead oxide.

4. Objective:

-Identifying the titanium oxide compound doped with lead oxide.

-Study of some optical properties of titanium oxide compound doped with lead oxide.

5. Materials:

Titanium, lead oxide, SiO_2, Distilled water.

6. Devices:

Magnetic mixer, Drying oven, Ultraviolet spectrophotometer, A computer with all accessories.

7. Method:

Five samples of titanium oxide doped with lead oxide were prepared according

to the following equation: (so that the value of x is: (0.9, 0.7, 0.5, 0.3, 0.1) via gelatinous solution with water (H_2O) distilled in an acidic medium = 5PH and temperature Place the mixture in the magnetic mixer for an hour, and the compound is formed. The compound is stored at room temperature for 24 hours, then dried in a drying oven at a temperature of for an hour, so the compound oxide is formed, as indicated in the previous formula. The optical properties of the samples were studied. Using an ultraviolet and visible spectrometer, model 1240

8. Results and Discussion:

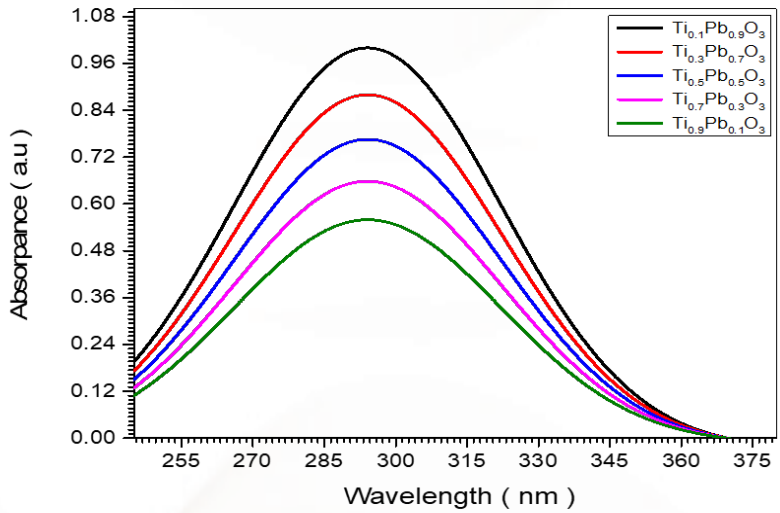
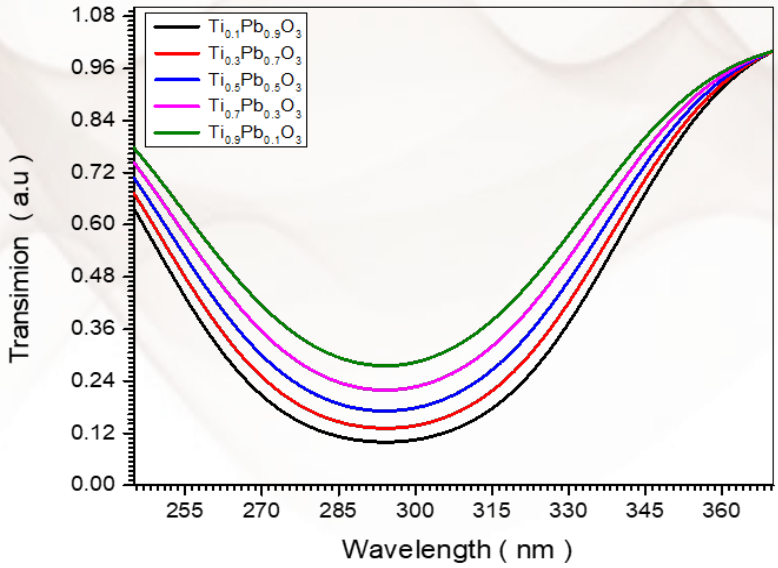


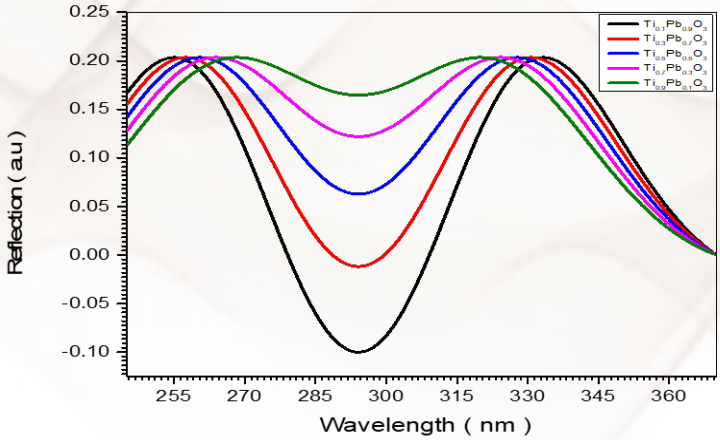
Figure (1) represents the relationship between absorbance and wavelengths From samples ($Ti_x Pb_{1-x} O_3$).

In absorbance, it was found that the behavior of the curves is the same as for titanium oxide doped with lead oxide by studying it using a UV-VS min 1240 spectrophotometer. Showing each absorbance moment shows us the rapid increase in absorption at wavelengths of 290 nm and the transverse photon energy is 4.28 eV. The effect of the molar ratio of (Pb_{1-x}) on the absorbance value. (Pb_{1-x}) had an increase in the absorbance value.



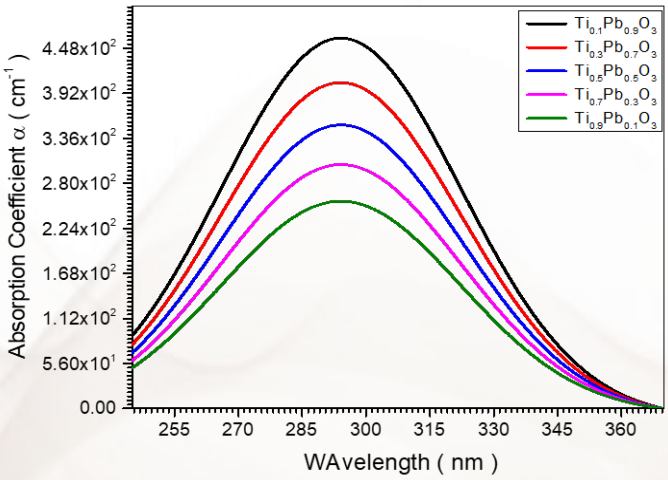
Fig(2) represents the relationship between transimission and wavelengths From samples ($Ti_x Pb_{1-x} O_3$).

The behavior of the curves was found to be the same for the titanium oxide grafted lead oxide samples studied by using a UV-VS min 1240 spectrophotometer. All transmission moments are shown in Figure (2). Which shows the relationship between transmission and wavelengths, the rapid decrease in transmission at wavelengths of 290 nm. The effect of the molar percentage of (Pb_{1-x}) on the transfer value was incereces for (Pb_{1-x}) in decreasing the transfer rate.



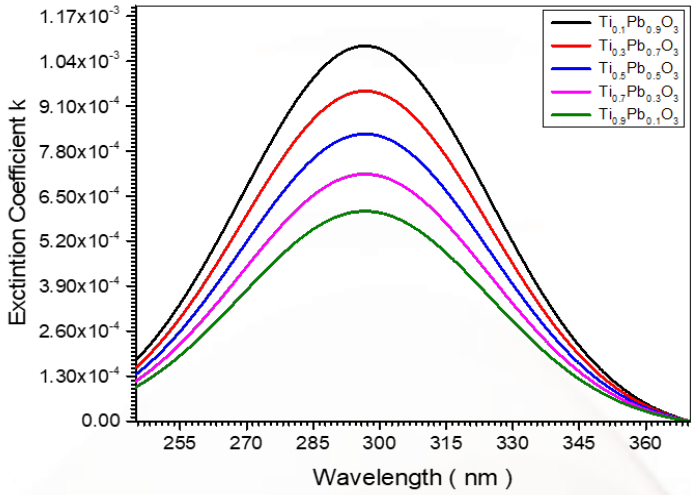
Fig(3) represents the relationship between reflection and wavelengths From samples ($Ti_x Pb_{1-x} O_3$).

The optical reflectance(R) spectra in the (245 - 380) nm wavelength range for the Titanum Oxide doping by Lead Oxide ($Ti_x Pb_{1-x} O_3$) samples are depicted in Fig (3). The maximum reflection observed at ranged (250 to 330) nm for all samples in this ranged the samples will be mirror, then it decreases to after 330 nm.



Fig(4) represents the relationship between absorption coefficient and wavelengths From samples ($Ti_x Pb_{1-x} O_3$).

Absorption coefficient (α): The absorption coefficient (α) of the five prepared sample by SiO_2 were found from the following relation where (A) is the absorbance and (t) is the optical legth in the samples . In fig (4) shows the plot of (α) with wavelength (λ) of the sample was tretednent by Titanum Oxide doping by Lead Oxide ($Ti_x\ Pb_{1-x}\ O_3$) , which obtained that the value of α = $0.459x10^3\ cm^{-1}$ for ($Ti_{0.1}\ Pb_{0.9}\ O_3$) sample in the UV region(290 nm)but for the ($Ti_{0.9}\ Pb_{0.1}\ O_2$) sample equal $0.257x10^3\ cm^{-1}$, This means that the transition must correspond to an indirect electronic transfer, and the characteristics of this state are important because it is responsible for the electrical conduction process. Figure (4) also shows that the value (α) of titanium oxide doping by lead oxide samples ($Ti_x\ Pb_{1-x}\ O_3$) increases while (Pb_{1-x}) increased.



Fig(5) represents the relationship between exctintion coefficient and wavelengths From samples ($Ti_x\ Pb_{1-x}\ O_3$).

Extinction coefficient (K): The extinction coefficient (K) was calculated using the relevant k = αν/4π and is shown in the graph in the values of (K) as a function of (π). For the inoculation of titanium oxide with lead oxide samples ($Ti_x\ Pb_{1-x}\ O_3$), it was noted that the shape of the spectrum for (K)

is the same as that of (α). The extinction coefficient (K) was obtained with a value of (K) at the wavelength (290 nm) based on the sample processing method, where the value of (K) at 290 nm for the sample ratio ($Ti_{0.1}$ $Pb_{0.9}$ O_3) was equal to 1.08 x 10^{-3}. While for the other sample ($Ti_{0.9}$ $Pb_{0.1}$ O_3) it vibrates at a specific wavelength equal to 6.05x10^{-4}. The effect of (Pb_{1-x}) on the extinction coefficient (Pb_{1-x}) was increased as the extinction coefficient (k) was increased.

9. Recommendations:

-Study other physical properties of this compound.

-Conduct further research into different compounds.

10. Conclusion:

This research dealt with the knowledge of the titanium oxide compound doping with lead oxide prepared in a laboratory, in addition to studying some optical properties (absorption, transmittance, reflection coefficient, absorption coefficient and the extinction coefficient).

Reference:

(1) Andersson, N. (2003). "Emission spectra of TiH and TiD near 938 nm" (PDF). J.Chem. Phys. C. 118: 10543. DOI:10.1063/1.1539848.

(2) Jump up to: a b c w c h f d y Krebs, Robert E. (2006). The History and Use of Our Earth's Chemical Elements: A Reference Guide (2nd ed.). Westport, CT: Greenwood Press. ISBN:978-0-313-33438-2. Archived from the original on 2021-08-31.

(3) Gregor, William (1791) "Beobachtungen und Versuche **über** den Menakanit, einen in Cornwall gefundenen magneticischen Sand" (Observations and experiments regarding menaccanite [i.e., ilmenite], a magnetic sand found in Cornwall), Chemische Annalen…, 1, pp. 40–54, 103–119. Archived copy 2021-08-24 on the Wayback Machine website.

(4) Gregor, William (1791) "Sur le menacanite, especially available by the people, in the province of Cornouilles" (On menacanite, a species of magnetic sand, found in the county of Cornwall), Observations et Mémoires sur la Physique, 39: 72–78, 152–160. Archived copy dated September 30, 2020 on the Wayback Machine website.

(5) Klaproth, Martin Heinrich (1795) "Chemical investigation of the so-called Hungarian red tourmaline [rutile]) in: Beiträge zur chemischen Kenntniss der Mineralkörper (Contributions to the chemical knowledge of mineral substances), vol. 1, (Berlin, (Germany): Heinrich August Rottmann, 233–244. Archived copy 2021-08-24 on the Wayback Machine website.

(6) Acton, Q. A., Editor (2013). Issues in Global Environment—Pollution and Waste Management: 2012 Edition. ScholarlyEditions. ISBN:978-1-4816-4665-9. Archived from the original on 07/08/2019.

(7) Agency for Toxic Substances and Disease Registry. "Information for the Community: Lead Toxicity" (MP4 webcast, 82 MB). Archived from the original on August 6, 2019. Viewed on 02-11-2017.

(8) Agency for Toxic Substances and Disease Registry (2017). "Lead Toxicity. What Are U.S. Standards for Lead Levels?" Archived from the original on 03-12-2020. Viewed on 06-12-2018.

(9) Alsfasser, R. (2007). Moderne anorganische Chemie [Modern inorganic chemistry] (in German). Walter de Gruyter. ISBN:978-3-11-019060-1. Archived from the original on 2020-03-12.

(10) American Geophysical Union (2017). "Human Activity Has Polluted European Air for 2000 Years". Eos Science News. Archived from the original on September 14, 2019.

(11) Amstock, J. S. (1997). Handbook of Glass in Construction. McGraw-Hill Professional. ISBN:978-0-07-001619-4. Archived from the original on 03-27-2020.

(12) Anderson, J. (1869). "Malleability and ductility of metals". Scientific American. C. 21 p. 22: 341–43. DOI:10.1038/scientificamerican11271869-341. Archived from the original on September 28, 2018.

(13) IUPAC, Compendium of Chemical Terminology, 2nd ed. (the "Gold Book") (1997). Online corrected version: (2006–) "Absorbance". doi:10.1351/goldbook.A00028.

(14) Jump up to:[a] [b] IUPAC, Compendium of Chemical Terminology, 2nd ed. (the "Gold Book") (1997). Online corrected version: (2006–) "decadic absorbance". doi:10.1351/goldbook.D01536.

(15) Jump up to:[a] [b] Bertie, John E. (2006). «Glossary of Terms used in Vibrational Spectroscopy». In Griffiths, Peter R (ed.). Handbook of Vibrational Spectroscopy. doi:10.1002/0470027320.s8401. ISBN 0471988472.

(16) "[[International Union of Pure and Applied Chemistry]] handbook definition" (PDF). Archived from the original (PDF) on 10/14/2008. Viewed on 07/02/2009.

(17) Lekner, John (1987). Theory of Reflection, of Electromagnetic and Particle Waves. Springer. ISBN 9789024734184.

(18) ^Mandelstam, L.I. (1926). "Light Scattering by Inhomogeneous Media". Zh. Russ. Fiz-Khim. Ova. **58**: 381.

(19) Absorption of Light", A LEVEL CHEMISTRY.

(20) Absorption", RB Photonics ENCYCLOPEDIA.

(21) Lange's Handbook of Chemistry, 14th Edition, Dean, J.A., Ed. (1992). McGraw-Hill, Inc., New York.

(22) Handbook of Chemistry and Physics, 56th Edition, Weast, R.C., Ed. (1975). CRC Press, Cleveland.

(23) Gill, S.C. and von Hippel, P.H. (1989). Calculation of protein extinction coefficients from amino acid sequence data. Anal. Biochem. 182:319-26.

(24) Pace, C.N., et al. (1995). How to measure and predict the molar absorption coefficient of a protein. Protein Sci. 4:2411-23.

(25) Practical Handbook of Biochemistry and Molecular Biology, Fasman, D.G., Ed. (1992). CRC Press, Boston.

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