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Studying the Effect of Oxidation Reagent on Preoaration of Zinc Chromate

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Abstract
Zinc Chromate was synthesised by Co-precipitation method, we have been using several oxidizing agents and found that the best one water oxygen because of the nice jamming least compared to the rest of the spectrum, The synthesized samples were characterized using X-ray powder diffraction technology (XRD).Set temperature synthesis at 250 ℃ . Muller indexes (h k l) were calculated for the production, and it was clear that, the compound crystallized according to orthorhombic lattice with following parameters

a = 5.2022 (Å), b = 8.5214 (Å), c = 6.3660 (Å)

The space group of symmetry is (R_3C).
The IR spectroscopy encourage our results during the bonding vibrations of Zn-O, Cr-O .
Keywords: Coprecipitation, Znic chromate, orthorhombic

1. Introduction

ABO4 type ternary metal oxides (where A and B are two different metallic elements with oxidation states of 2+ and 6+ , respectively) have gained considerable importance due to their unique properties and potential applications in the fields of photoluminescence [1], scintillation [2], photosensitization [3],etc. Among all these oxides ternary metal chromate oxides have vast utility due to their applications as photosensitizers, photoconductive dielectric materials, humidity sensing resistors, yellow pigments, and effective solid lubricants.
Zinc chromate is an insoluble cr(VI) compound and widely used for corrosion prevention and in pigments[4]. Zinc chromate causes cancer in experimental animals following intrapleural and intrabronchial implantation [5].

Chromates have been synthesized by different methods such as Solid – state method, co-precipitation method, Sol - gel method and hydrothermal synthesis.

In works [6] Chromates have been synthesized by mixed $K_2Cr_2O_7$ with $Zn(NO_3)_2$.6H2O and the pH of the mixture was adjusted to a specific value by adding NaOH solution in the end we have $ZnCrO_4.K_2O,3H_2O$ that crystal have monoclinic phase.

Study of the thermal decomposition in air of zinc chromates from several sources was conducted using thermograv-imetry, chemical analysis, emission spectroscopy and X-ray diffraction analysis. Four zinc chromate samples were obtained from commercial suppliers and four others were prepared in this laboratory. Chromates have been synthesized by mixed $ZnCO_3$ with CrO_3 and heated to remove CO_2, It was sealed in a glass tube and heated 4 h at 208℃. After washing with cold H_20, the sample was dried at 110℃, was the best [7].

ZnO is a white powder that is insoluble in water, which is widely used as an additive in numerous materials and products including plastics, ceramics, glass, cement, lubricants.

Chromium (VI) oxide is used for chromium plating, copper stripping; as an oxidizing agent for conversion of secondary alcohols into ketones (Jones oxidation), as a corrosion inhibitor, in purification of oil, and in chromic mixtures for cleaning laboratory glassware.

2. The goal of the research:

The synthesis of Zinc chromate way joint precipitation from Zinc chloride quaternary salt and Cheomum chloride, and the study of crystalline and structural characteristics in general, and to find the temperature of synthesis and the appropriate conditions for it, such as pH center and focus of aqueous solutions of metal chlorides entering the process.

3. Materials and equipment's:

- Samples dryer: Memmert brand
- Incinerator type Carbolit, temperature up to1100°C.
- X-Ray powder diffraction, Philips-PW-1840 model

• Differential Thermal Analysis (DTA),Chimadzu
• Chromium trichloride (assay 99.9%)
• Zinc Chloride $ZnCl_2.6H_2O$ (BDH 98%)
• Sodium hydroxide (assay 99.5%)
• Distilled water for washing and extension
This material has a high purity in order to obtain accurate results on the one hand and to avoid the occurrence of unwanted secondary reactions during work on the other hand

4. Practical section:
Sample preparation and method of synthesis;
Vines was the synthesis of zinc using sedimentation polytheist and using various oxidizing agents has been shown that the results gave some variation

$$2CrCl_3 + 2ZnCl_2 + 10NaOH + 3/2O2 \rightarrow 2ZnCrO_4 + 10NaCl + 5H_2O$$

The molar weights account in accordance with the molar ratios of the previous equation and calculated the amount of oxidant for chrome was (1.1.5) oxidant material the following table shows the weights

$CrCl_3.6H_2O$	$ZnCl_2$	NaOH
1.4688 gr	0.7665 gr	1.1133 gr

We take the weights indicated in the table according to the former molar ratios of the previous equation and put in flask volumetric capacity of 50 ml, and then add distilled water. Keep chromium chloride and zinc chloride solution in each Burette 50 mL and put sodium hydroxide solution in flask and we start adding solution minerals and that one drop by drop with constant stirring I took added process with a time of two hours we leave the solution for 24 hours to fully precipitation. Note discoloration of the solution in blue-green (color of $Cr(OH)_3$) and then add the amount of oxidized agents and Heat gently And leave the solution for two hours' notice discoloration of the solution in yellow we nomination to suppress Buchner and wash the precipitate several Mrart with distilled water until we get rid of the chlorine ions is checked using a silver nitrate (0.1 m). We dry the sludge and then at 105 ° C for 24 hours. Convey the sludge to calcined to burn at a temperature of 250 C for three hours after taking part for the purpose of analysis by using the differential thermal device. After calcination we analysis by using x-ray diffraction device

4-Results and Discussion:
4-1 Studying x-ray diffraction diagrams (XRD):

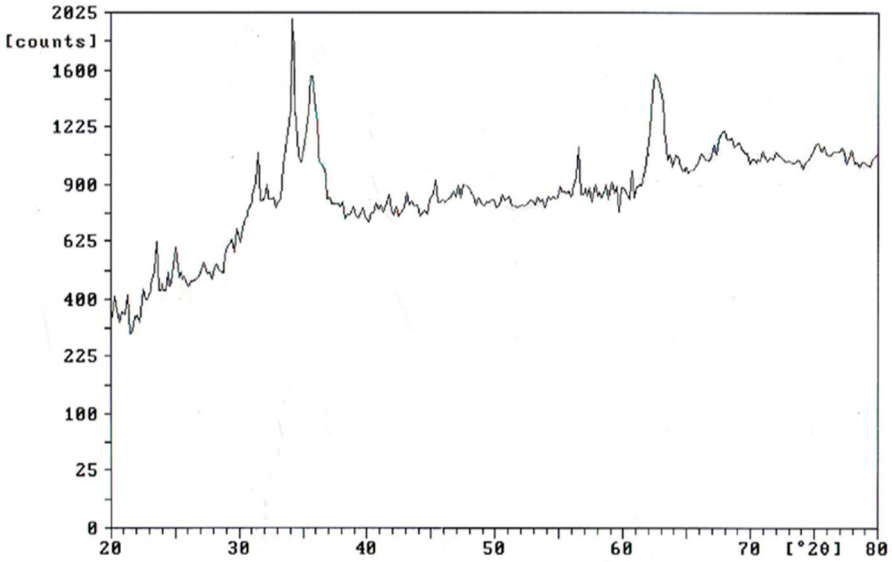


Figure (1) X-ray diffraction for a sample of zinc chromate was calcination at 250℃ with oxidized agents H_2O_2

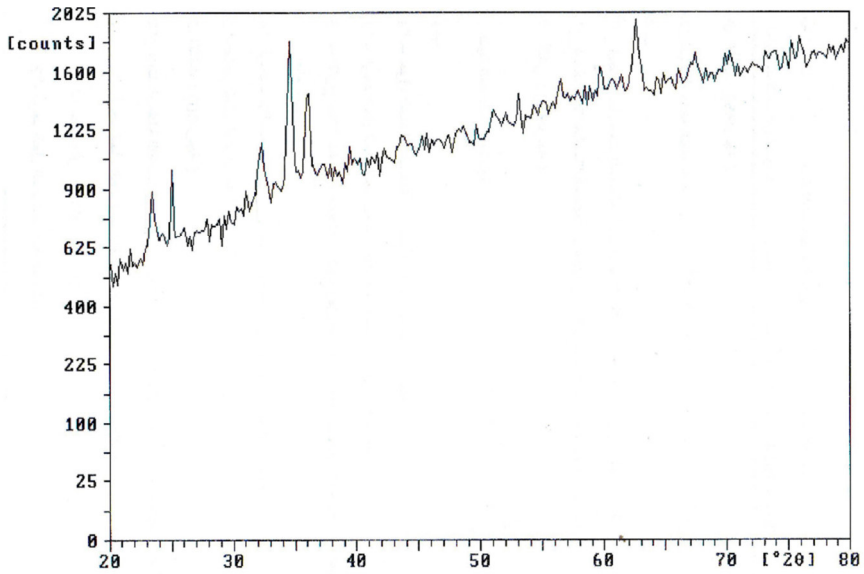
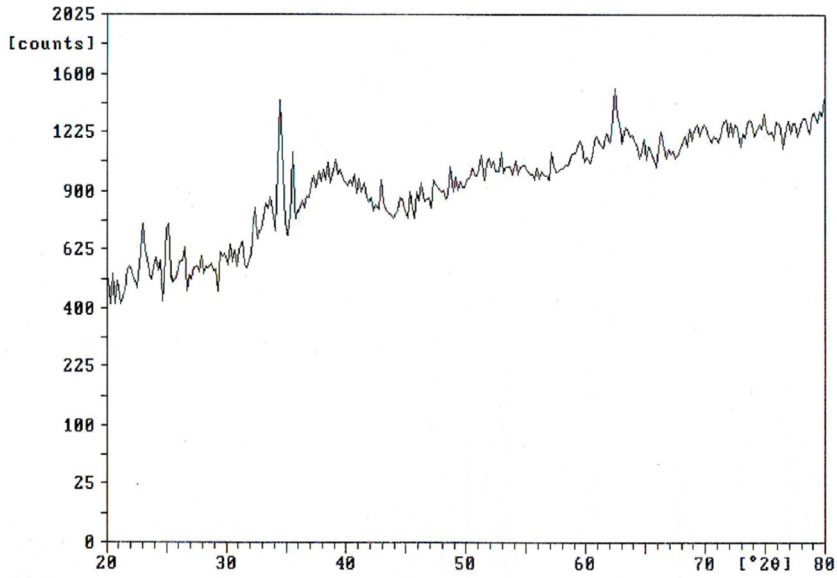


Figure (2) X-ray diffraction for a sample of zinc chromate was calcination at 250℃ with oxidized agents



NaClO

Figure (3) X-ray diffraction for a sample of zinc chromate was calcination at 250℃ with oxidized agents

$NaClO_2$

Table (2) illustrated the results of the previous X-ray spectroscopy of the sample and Muller indexes (hkl) were calculated for the production shown in Figure (1)

2θ	θ	I/I_0	d	$1/d^2$	h k l
23.75	11.75	35	3.7825	0.0698	1 1 1
25.13	12.56	30	3.5407	0.0797	0 2 1
31.54	15.77	45	2.8333	0.1245	0 1 2
32.35	17.11	18	2.6181	0.1458	2 0 0
34.23	18.00	100	2.4926	0.1609	1 1 2
36.00	20.95	80	2.1538	0.2155	0 3 2
41.90	21.55	20	2.0966	0.2274	2 2 1
43.11	22.69	25	1.9968	0.2507	2 0 2
45.31	28.41	30	1.6187	0.3816	1 3 3
56.83	31.41	35	1.4778	0.4578	3 3 0
62.66	34.45	60	1.3616	0.5393	2 6 0
68.81	31.415	20	1.4778	0.4578	0 2 4
a= 5.2022 (Å)	**b=8.5214 (Å)**	**c= 6.3660 (Å)**			

Muller indexes (hkl) was calculated by rapport:

$$\frac{1}{d^2} = \frac{h^2}{a^2} + \frac{k^2}{b^2} + \frac{l^2}{c^2}$$

4-2 The study of compounds generated using the infrared spectrum:

The calcined sample study at a temperature of 250 ° C h2o2 the presence of oxidizing agent:

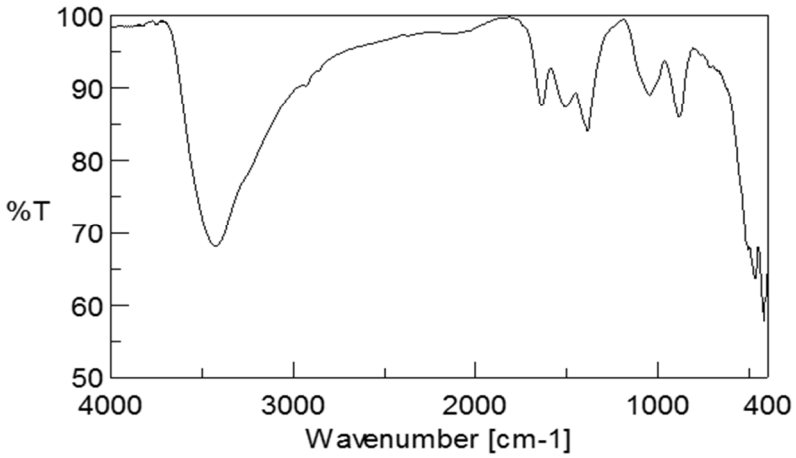


Figure (4) the calcined sample study at a temperature of 250 °C H_2O_2 the presence of oxidizing agent

We have found a group of peaks shown in the following table belonging to zinc chromate prepared

Waveform cm^{-1}	Vibration pattern
425	Zn-O
480	Cr-O
3450	O-H

Also note the presence of peaks between the (1400 -1750 Cm^{-1}) returning to the ion CrO42- This Maitvq with reference [13] We can not judge a composite structure using infrared spectroscopy alone, but we used this spectroscopy to confirm the composite structure that we have obtained through the yaw schemes XRD X-ray can show our Association metal oxygen only.

References

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