1st International Congress on Analytical Chemistry, Electrochemistry and Separation Techniques
October 15th-16th, 2022

ID: 113

GREEN CONTROL AND CHARACTERIZATION OF SYNTHESIZED CHROMIUM NANOPARTICLES APPLICATION ON 2-AMINOPHENOL

Hamza KELLOU[1,2], Salem BOUDINAR[1], Abdelhafid SOUICI[2], Nassima BENBRAHIM[1]

1-Laboratoire de Physique et Chimie des Matériaux (LPCM), Université Mouloud MAMMERI de Tizi-Ouzou, BP 17, RP Tizi-Ouzou 15000, Algeria.

2-bLaboratoire de Physico-chimie des Matériaux et Catalyse (LPCMC), Université Abderrahmane Mira de Bejaïa, CP 06000, Bejaïa, Algeria.

Email: hamza.kellou@ummto.dz

INTRODUCTION

This study, focuses on two oxidation states. We will make a reduction of Cr^{+6} to Cr^{+3} to change its physiological effect and use it in the inhibition. We will put the synthesized NPW in an application made in water, because Cr^{+3} is not water soluble, this dioxyde has been studied by a considerable number of researchers. Cerar [1], studied the reaction between Cr^{+3} and EDTA ions to learn more about the reaction of its chemical kinetics. TIAN et al. [2], Produced and Characterized Cr_2O_3 via a Facile Combination of Electrooxidation and Calcination. Cr^{+6}, was used as a precursor in the synthesize process of Cr^{+3}, by a chemical method. The addition of the Arabic Gum (GA) was in two samples (0.005 and 0.033M) and one sample without GA, with the presence of $NaBH_4$ (0.125M) as the reducing agent, Figure 2. The obtained Cr_2O_3 nanoparticles were characterized by several methods. All experiments were performed at room temperature and all the products were used without any further purification. The collection process of Cr_2O_3 NPs was done by ultra-centrifugation at 400 rpm for 30 min. The collected NPs were then washed with distilled water several times by re-suspension and ultra-centrifugation cycles consecutively. Finally the collected nanopowders (NPWs) used in the photostabilisation of 2AP

REFERENCES

[1] CERAR, *J. Acta Chimica Slovenica*, **2015**, *vol. 62*, no 3, p. 538-545.
[2] TIAN, S. et al. *Int. J. of Elec-chem. Sci.*, **2019**, *vol. 14*, p. 8805-8818.

RESULTS AND DISCUSSION

Figure 1 : Dispositif of UV irradiation applied on 2AP

Preparation of test samples

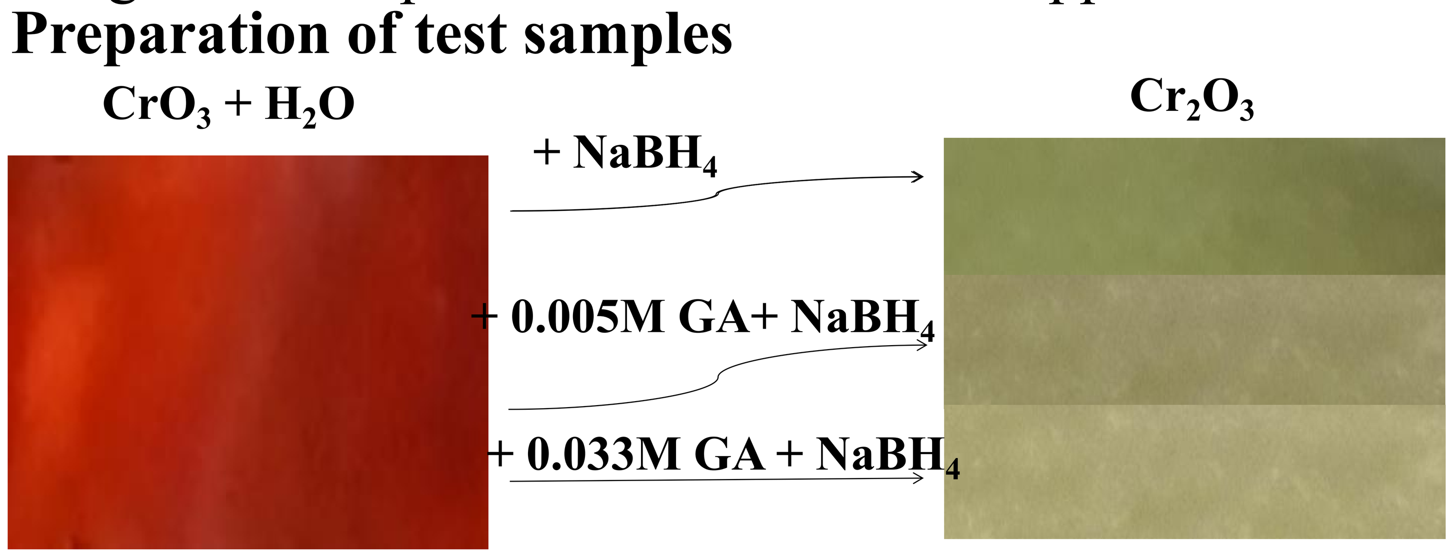

Figure 2 : The reducing process and the change in colours for the different condition of synthesis.

UV-Vis spectrum of CrO_3 for different samples, shows peaks arround 257 and 350 nm. After the reducting process showed peaks were at 271 and 372 nm [1]. We got three peaks in the solid UV-Vis analysis arround 271, 394 and 596 nm.

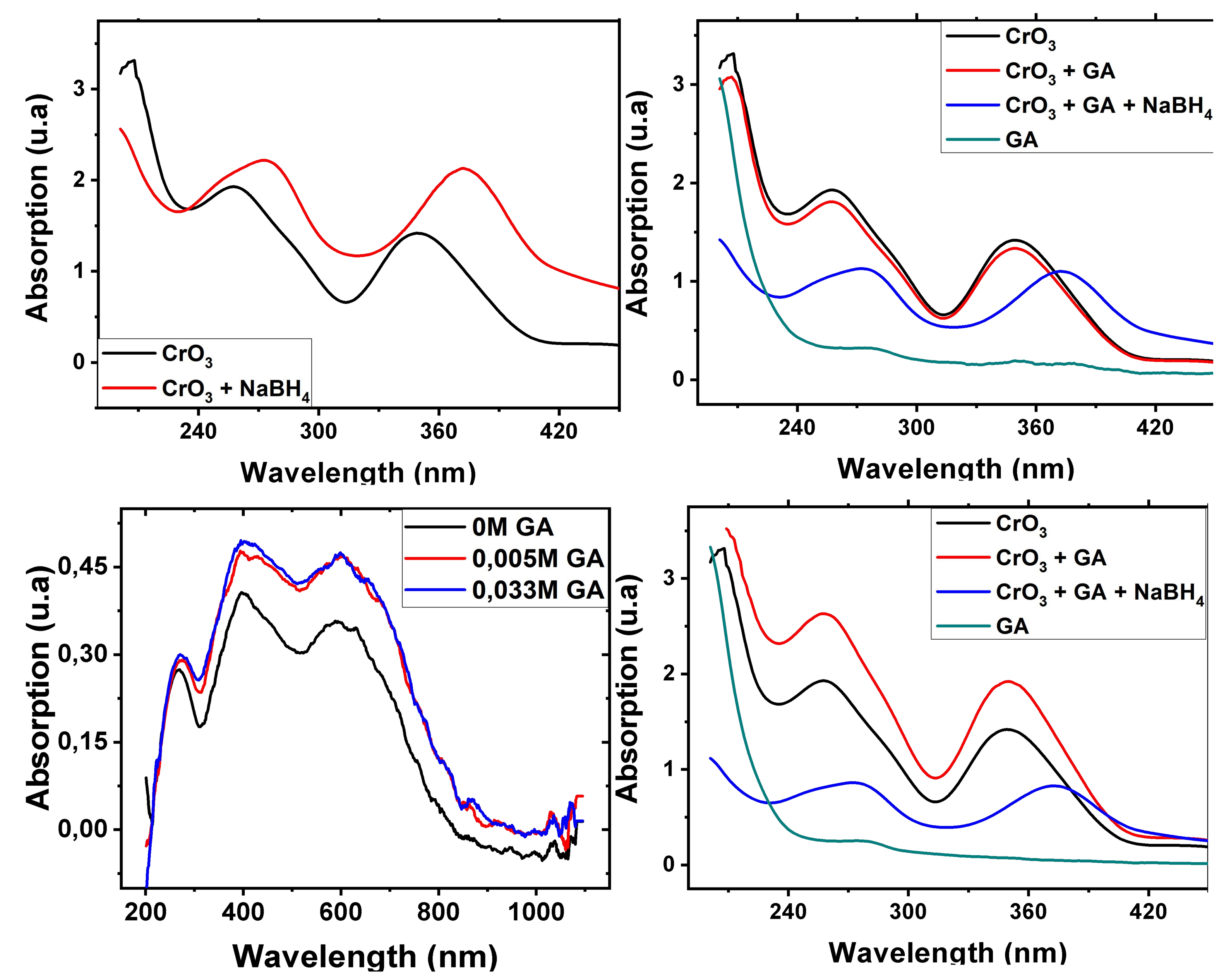

Figure 3 : Liquid and solid UV-Vis spectroscopy

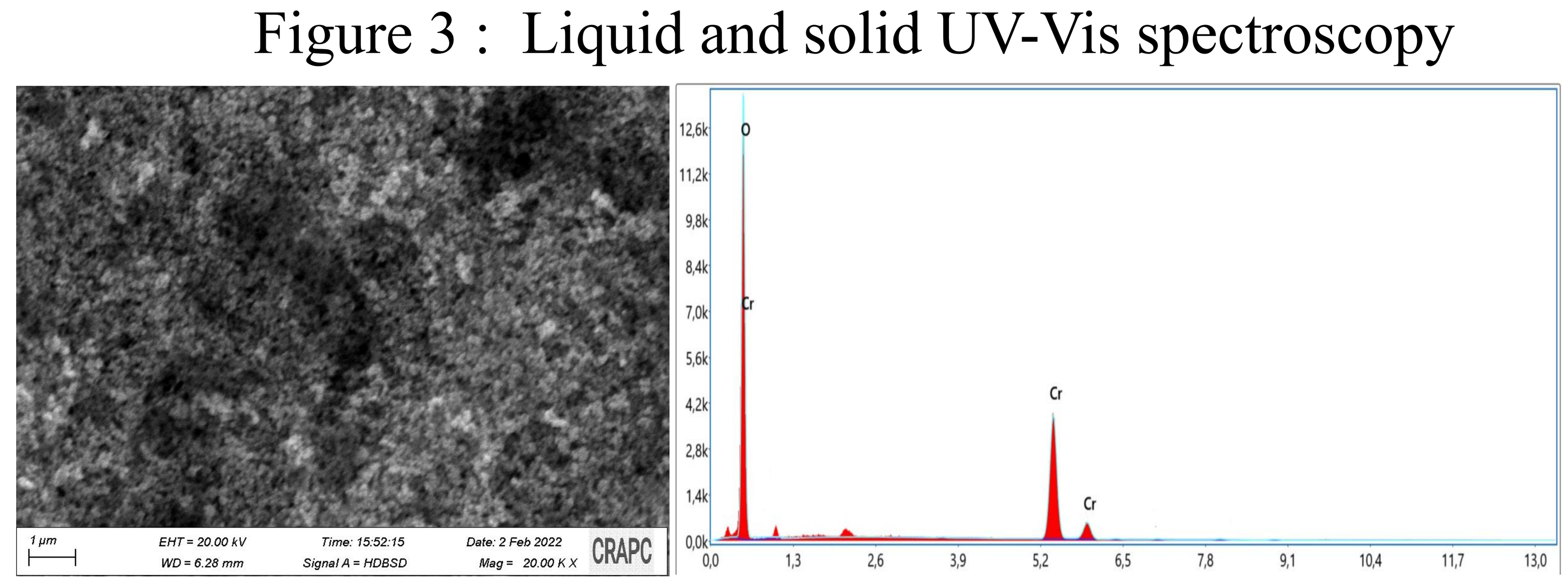

Figure 4 : SEM imaging and EDX spectroscopy

SEM imaging shows that the NPs are nanometrical, and the **EDS** shows the composition of this NPW which contain Cr and O, with 2 amount of 'Cr' and 3 amount of 'O'.

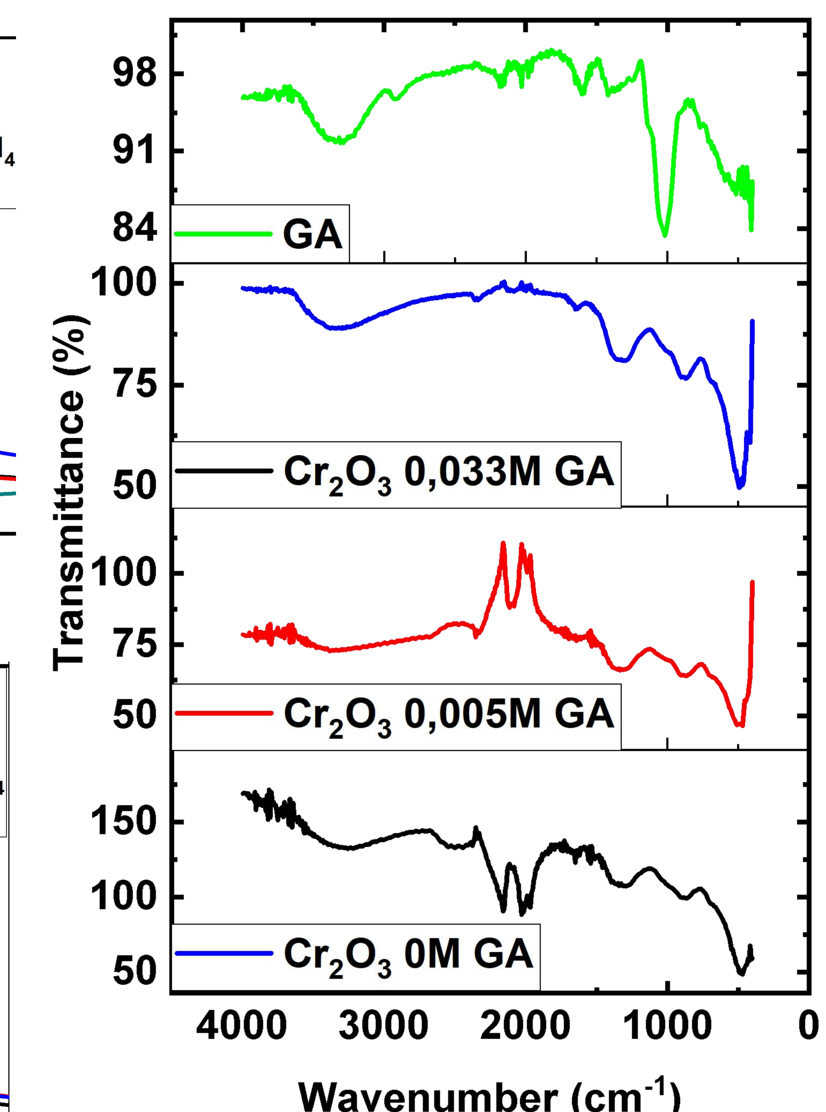

Figure 5 : FT-IR Patterns

FT-IR : a wide range of OCrO bond distances, is translated by a large broadness of the bands between 880-850 cm^{-1} in all patterns. the bands at 585-641 cm^{-1} are assigned to Cr-O vibrations and 1046-1085 cm^{-1} are assigned to Cr-O-Cr vibrations. the region between 2150-1850 cm^{-1} confirms the presence of Cr=O species

Photostabilisation : The figure of 2AP, in the presence of Cr-NPW, shows the protection of the 2AP by concerving its peak between 250-300 nm, compared with the solution which is without NPW, which represente a raising of the second peak 2-amino-3H-phenoxazin-3-one (APO), which is the oxidation of 2AP.

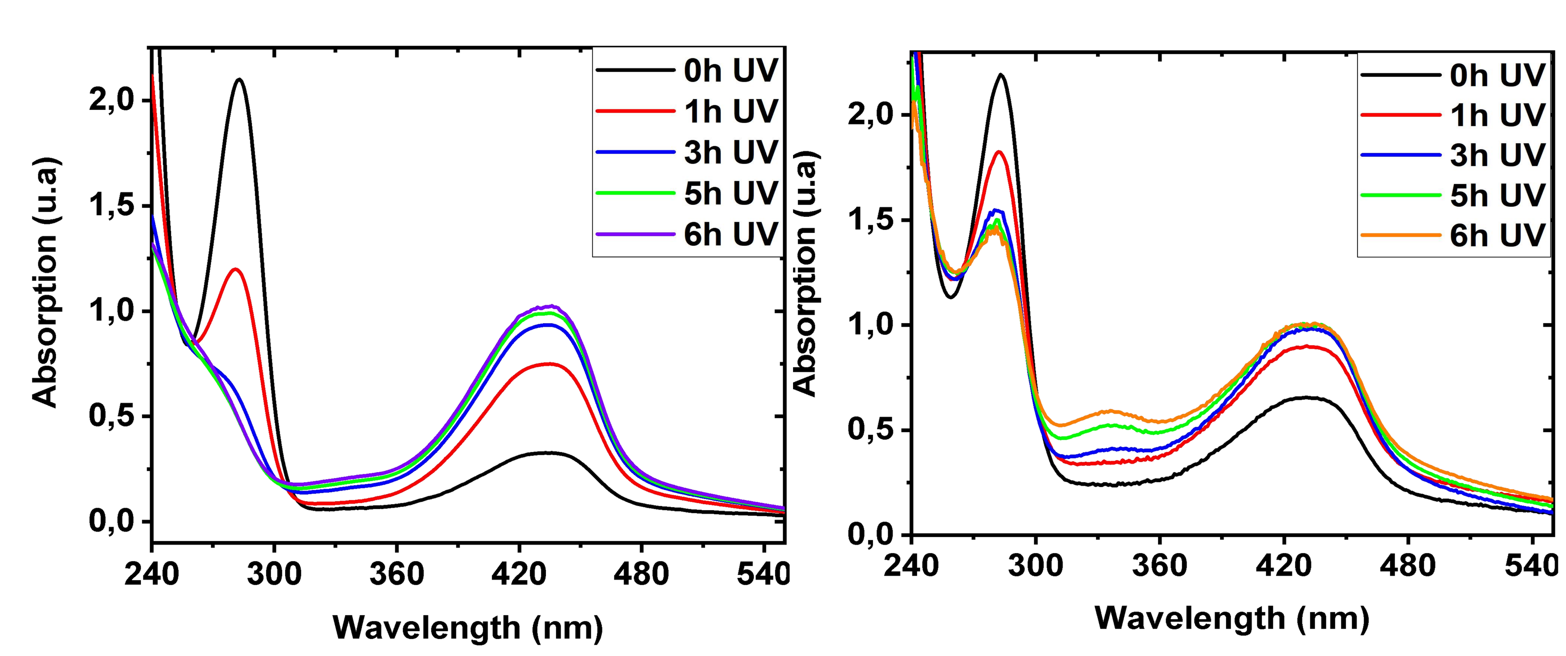

Figure 6 : 2AP under UV-Vis irradiation with and without Cr-NPW

CONCLUSION

In the present work, an environmentally friendly product (Cr^{+3}) was synthesized by a chemical and green method, from a highly hazardous product (Cr^{+6}). The use of Cr-NPW in the photostabilization of 2AP from oxidation to APO (UV-visible spectroscopy) was successful, we can say that, because of the efficiency of Cr-NPW to protect and stabilize 2AP from oxidation to APO under UV light.

Name & grade: Hamza KELLOU Phd Student in Physics, Matter and Radiation
Affiliation: LPCM/UMMTO
Domain of research : Science of matter
Tel: +213540604059