



﴿ قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ ﴾

صدق الله العظيم

البقرة الآية ٣٢

## **Dedication**

To who enlightening my path, to those who have right, offer Allah.

### **My parent**

To the one who bears with silence the hardship of my study with no much complaining, of the completion, of my scientific journey.

### **My family**

My dear mother and my brothers and sisters.

## **Acknowledgement**

Praise is to Allah, who says: (if ye are grateful, I will add more)

And peace and blessing be upon the prophet, who say: “The one

Who doesn't thank people, doesn't thank God/ Allah “.

Thanks for Allah, Who guides me to Islam. My thanks

Extends to my teacher, Porf: Mubarak Dirar Abd-alla. For his sincere

advice, and the efforts that exerted with me through this study.

I would like also to express my gratitude to department of physical, college of science, graduate college in Sudan university of science and technology.

## Abstract

In this work, the energy gap was determined for samples of the copper oxide (CuO) and zinc oxide (ZnO) at different temperatures ranging from ( 150 to 330 ) °C. The absorption and transmission spectra ,shows the energy gap for (CuO) and (ZnO) in the range from (2.44- 2.19)  $eV$  and (3.84-3.31)  $eV$ , respectively. These values are comparable to the actual values. Also electrical method was used to determine the energy gaps for (CuO) and (ZnO) , of voltages at in terms which the current increases suddenly, The value of the energy gap for each of (CuO) and( ZnO) was found to be in the range (2.19 to 1.76) , (3.59 to 2.89)  $eV$ , respectively. Which again conforms with the actual values. Another electrical method based on four probes was also used for (CuO) at different temperatures in the range (60-150) °C and the resistivity of copper oxide has been found. It was utilized in determining the energy gap, which was found to be about 1.90  $eV$ . Again the obtained value is near the actual value.

## مستخلص البحث

في هذا العمل تم تحديد فجوة الطاقة لكل من أكسيد النحاس (CuO) وأكسيد الزنك (ZnO) في درجات حرارة مختلفة (150 إلى 330) درجة مئوية بين طيف الامتصاص والنفاذ أن قيمة فجوة الطاقة لكل من (CuO) و (ZnO) وقد تراوحت ما بين (2.44- 2.19) إلكترون فولت و (3.84- 3.31) إلكترون فولت على الترتيب وهذه القيم مطابقتها تماماً مع القيم الحقيقية. كما تم أيضا استخدام طريقة كهربية لتحديد فجوة الطاقة لكل من (CuO) و (ZnO) وبتحديد قيم فرق الجهد التي يتغير التيار فيها فجأة، وجد أن قيمة فجوة الطاقة لكل من (CuO) و (ZnO) باستخدام هذه الطريقة الكهربائية (2.199- 1.76) إلكترون فولت و (3.59- 2.94) إلكترون فولت على الترتيب ، مما يؤكد مره أخرى مطابقة القيم للقيم الحقيقية. كما استخدمه طريقة المسبار الرباعي لتحديد قيمة فجوة الطاقة لأكسيد (CuO) عند درجات حرارة مختلفة في المدى (60-150) وبايجاد الموصلية الكهربائية لأكسيد النحاس وجد أن قيمة فجوة الطاقة لأكسيد النحاس (CuO) حوالي 1.90 إلكترون فولت وهي قيمتقرية جداً من القيمة الحقيقية .

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