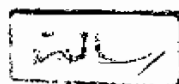


Ain Shams University
Faculty of Education
Physics Department

**Some Physical Properties Of Sputtering Cu-Ag And
Cu-Sn Alloys And Redeposition Of Sputtered Thin
Films In Different Plasma Atmospheres**

THESIS
Submitted for the Degree of
Master of Teacher Preparation
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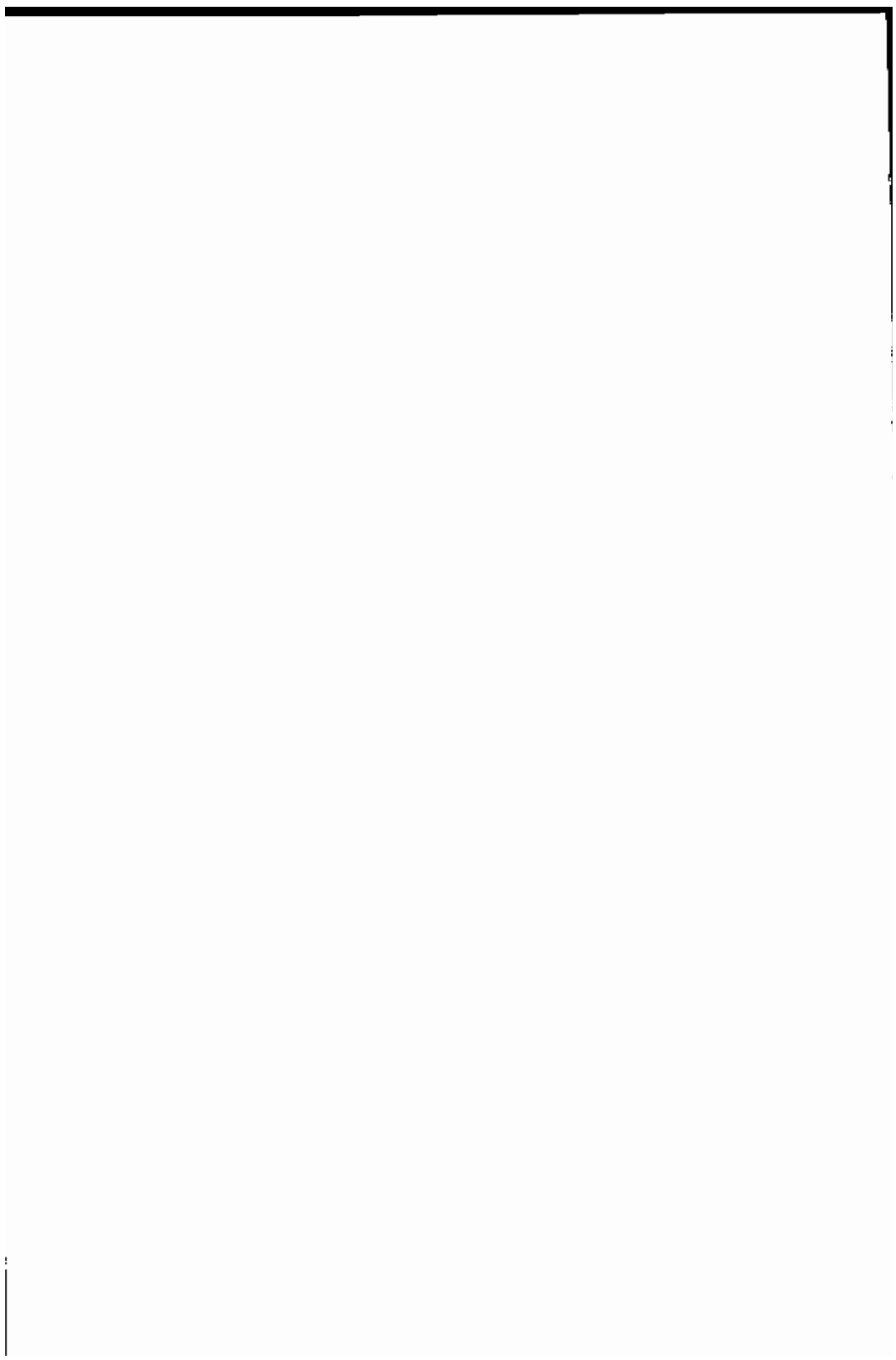
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

فَإِنَّكَ بِرَبِّكَ عَلَىٰ
عِلَّةٍ عَالِيَةٍ

إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ . صَدَقَ الْعَظِيمُ

أهداء

إلى أهل العلم أهدى عملي المتواضع ..
قطرة من بحر علمهم الفياض .
جزاهم الله عنا خير الجزاء .
والى أمي وأبي وزوجتي
وبفضل دعواتهم .. اتقدم

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Abstract

the first of these is the fact that the system is not closed. The system is open to the environment, and this means that there is a constant exchange of matter and energy between the system and the environment. This exchange is essential for the system to maintain its structure and function. The second point is that the system is not static. The system is constantly changing, and this change is driven by the exchange of matter and energy with the environment. The third point is that the system is not homogeneous. The system is composed of many different parts, and these parts are not all the same. This heterogeneity is essential for the system to be able to adapt to changes in the environment.

The fourth point is that the system is not isolated. The system is always interacting with the environment, and this interaction is essential for the system to be able to maintain its structure and function. The fifth point is that the system is not self-sufficient. The system needs to be able to obtain resources from the environment in order to maintain its structure and function. The sixth point is that the system is not self-organizing. The system needs to be able to organize itself in order to maintain its structure and function. The seventh point is that the system is not self-repairing. The system needs to be able to repair itself in order to maintain its structure and function. The eighth point is that the system is not self-regulating. The system needs to be able to regulate itself in order to maintain its structure and function. The ninth point is that the system is not self-protecting. The system needs to be able to protect itself in order to maintain its structure and function. The tenth point is that the system is not self-replicating. The system needs to be able to replicate itself in order to maintain its structure and function.

The eleventh point is that the system is not self-sustaining. The system needs to be able to sustain itself in order to maintain its structure and function. The twelfth point is that the system is not self-perpetuating. The system needs to be able to perpetuate itself in order to maintain its structure and function. The thirteenth point is that the system is not self-renewing. The system needs to be able to renew itself in order to maintain its structure and function. The fourteenth point is that the system is not self-renewing. The system needs to be able to renew itself in order to maintain its structure and function. The fifteenth point is that the system is not self-renewing. The system needs to be able to renew itself in order to maintain its structure and function.

Abstract

Ibtesam Ahmed Mousa. Some physical properties of sputtering Cu-Ag & Cu-Sn alloys and redeposition of sputtered thin films in different plasma atmospheres. Ain Shams University, Faculty of Education, physics department.

The present work is devoted to investigate:

1. The glow discharge and sputtering characteristics of the two mentioned copper alloys.
2. Surface topography and sputtering behaviour of Cu-6 wt% Ag and Cu-10 wt% Sn in different plasma atmospheres.
3. Some physical parameters affecting deposition rates of films formed in a magnetron sputtering system, and
4. Target profile change due to magnetron sputtering of Cu-Ag and Cu-Sn alloys.

Summary

The work presented in this thesis is devoted to investigate the physical properties of sputtering Cu-Ag & Cu-Sn alloys and redeposition of sputtered thin films in different plasma atmospheres. Four topics are discussed: 1) Glow discharge and sputtering characteristics of Cu-6 wt% Ag & Cu-10 wt% Sn targets. 2) Surface topography and sputtering behaviour of the two binary alloyed targets due to their ionic bombardment in different plasma atmospheres. 3) Physical parameters affecting deposition rates of thin films formed in a magnetron sputtering system, and 4) Target profile change due to deposition of backscattered material.

In the first topic, the effects of alloying silver and tin individually with copper on the glow discharge and sputtering characteristics of the two copper alloys are discussed. It was found that alloying either silver or tin with copper generally enhanced the glow discharge characteristics of pure copper in the two formed binary alloys. On the other hand, alloying silver with copper activated both oxidizing and nitriding processes of the Cu-Ag target where as tin in the Cu-Sn target hindered the two processes.

The second topic deals with surface topography and sputtering behaviour of the two alloys after treatment in different plasma atmospheres. Scanning electron microscopy was used to examine the bombarded surfaces. It was found that Ag in the Cu-Ag target increased its overall sputtering yield and consequently its surface erosion rate, while Sn on the other hand substantially reduced the sputtering yield of the Cu-Sn target.