

Characterization Of Hafnium Oxide Thin Films Prepared By Electron Beam Evaporation

Al-Kuhaili, MF; Durrani, SMA; Khawaja, EE

IOP PUBLISHING LTD, JOURNAL OF PHYSICS D-APPLIED PHYSICS; pp: 1254-1261;

Vol: 37

King Fahd University of Petroleum & Minerals

<http://www.kfupm.edu.sa>

Summary

Thin films of hafnium oxide were deposited by electron beam evaporation. The effects of the substrate temperature and the oxygen partial pressure on the refractive index and carbon monoxide sensing properties of the films were studied. The films were characterized using x-ray diffraction and x-ray photoelectron spectroscopy techniques. Films deposited on unheated substrates were amorphous, whereas those deposited on heated substrates showed a mixture of amorphous and polycrystalline structure. All the films were found to be optically inhomogeneous. The inhomogeneity of the films was taken into account in the determination of their refractive indices. It was found that the porosity (as reflected by the refractive indices) of the films was the main factor that affected the sensitivity of the films in relation to their detection of carbon monoxide.

References:

1. ADAMIK M, 1994, PHYS STATUS SOLIDI A, V145, P275
2. ALVISI M, 1999, THIN SOLID FILMS, V354, P19
3. ARNDT DP, 1984, APPL OPTICS, V23, P3571
4. BALOG M, 1977, THIN SOLID FILMS, V41, P247
5. BANGE K, 1999, SOL ENERG MAT SOL C, V58, P1
6. BAUMEISTER P, 1977, APPL OPTICS, V16, P439
7. BECKER T, 2001, SENSOR ACTUAT B-CHEM, V77, P55
8. BORGOGNO JP, 1982, APPL OPTICS, V21, P4020
9. CAPONE S, 1998, J VAC SCI TECHNOL A, V16, P3564
10. CHOW R, 1993, APPL OPTICS, V32, P5567

© Copyright: King Fahd University of Petroleum & Minerals;
<http://www.kfupm.edu.sa>

11. EDLOU SM, 1993, APPL OPTICS, V32, P5601
12. GILO M, 1999, THIN SOLID FILMS, V350, P203
13. HARRIS M, 1979, THIN SOLID FILMS, V57, P173
14. HEAVENS OS, 1991, OPTICAL PROPERTIES T
15. HO MY, 2003, J APPL PHYS, V93, P1477, DOI 10.1063/1.1534381
16. KHAWAJA E, 1976, J PHYS D APPL PHYS, V9, P1939
17. KHAWAJA EE, 1999, J PHYS D APPL PHYS, V32, P388
18. KHAWAJA EE, 2003, J PHYS D APPL PHYS, V36, P545
19. LEHAN JP, 1991, THIN SOLID FILMS, V203, P227
20. LYSAGHT PS, 2003, APPL PHYS LETT, V82, P1266, DOI 10.1063/1.1553998
21. REICHER D, 2000, APPL OPTICS, V39, P1589
22. RITALA M, 1994, THIN SOLID FILMS, V250, P72
23. SUNGSOON P, 1996, THIN SOLID FILMS, V274, P154

For pre-prints please write to: abstracts@kfupm.edu.sa