

Electron spectroscopy study in the NbN growth for NbN/AlN interfaces

Lucci M., Sanna S., Contini G., Zema N., Merlo V., Salvato M., Thanh H.N., Davoli I.

Università di Roma Tor Vergata, Via della Ricerca Scientifica 1, Roma, 00133, Italy; ISM-CNR, Via del Fosso del Cavaliere 100, Roma, 00133, Italy; Cryogenics Laboratory, Hanoi National University, 334 Nguyen Trai, Thanh Xuan, Hanoi, Viet Nam; CNR/INFM Laboratorio Regionale SuperMat, I-84081 Baronissi, Sa, Italy; Micro and Nano-structured Systems Laboratory (MINAS) Università di Roma, Tor Vergata, Italy

Abstract: NbN superconductor and wide band gap AlN thin films were deposited using sputtering at room temperature. Study of the nitride interfaces are forerunner to the growth Josephson junctions that are considered able to work in the terahertz frequency. We find that to be compatible with lithography technology and to have a high critical transition temperature, the substrate should not be overheated, and this means working in low power regime to limit the induced heating of the plasma. X-ray photoelectron spectroscopy and X-ray diffraction analysis were performed on samples deposited on crystalline, amorphous, flexible, and nanostructured substrates. The experimental results suggest us how to improve the deposition process in order to obtain the best nitride films as well as NbN/AlN/NbN trilayers for Josephson junction applications. © 2006 Elsevier B.V. All rights reserved.

Author Keywords: AlN; Electron spectroscopy; Josephson junctions; NbN; Superconducting

Index Keywords: Aluminum compounds; Electron spectroscopy; Energy gap; Interfaces (materials); Josephson junction devices; Niobium compounds; Superconducting materials; Thin films; X ray photoelectron spectroscopy; Josephson junctions; Terahertz frequencies; Film growth

Year: 2007

Source title: Surface Science

Volume: 601

Issue: 13

Page : 2647-2650

Cited by: 3

Link: [Scopus Link](#)

Correspondence Address: Davoli, I.; Università di Roma Tor Vergata, Via della Ricerca Scientifica 1, Roma, 00133, Italy; email: ivan.davoli@roma2.infn.it

ISSN: 396028

CODEN: SUSCA

DOI: 10.1016/j.susc.2006.11.078

Language of Original Document: English

Abbreviated Source Title: Surface Science

Document Type: Article

Source: Scopus

Authors with affiliations:

- Lucci, M., Università di Roma Tor Vergata, Via della Ricerca Scientifica 1, Roma, 00133, Italy, Micro and Nano-structured Systems Laboratory (MINAS) Università di Roma, Tor Vergata, Italy
- Sanna, S., Università di Roma Tor Vergata, Via della Ricerca Scientifica 1, Roma, 00133, Italy
- Contini, G., ISM-CNR, Via del Fosso del Cavaliere 100, Roma, 00133, Italy
- Zema, N., ISM-CNR, Via del Fosso del Cavaliere 100, Roma, 00133, Italy
- Merlo, V., Università di Roma Tor Vergata, Via della Ricerca Scientifica 1, Roma, 00133, Italy, Micro and Nano-structured Systems Laboratory (MINAS) Università di Roma, Tor Vergata, Italy
- Salvato, M., Università di Roma Tor Vergata, Via della Ricerca Scientifica 1, Roma, 00133, Italy, CNR/INFM Laboratorio Regionale SuperMat, I-84081 Baronissi, Sa, Italy, Micro and Nano-structured Systems Laboratory (MINAS) Università di Roma, Tor Vergata, Italy
- Thanh, H.N., Università di Roma Tor Vergata, Via della Ricerca Scientifica 1, Roma, 00133, Italy, Cryogenics Laboratory, Hanoi National University, 334 Nguyen Trai, Thanh Xuan, Hanoi, Viet Nam
- Davoli, I., Università di Roma Tor Vergata, Via della Ricerca Scientifica 1, Roma, 00133, Italy, Micro and Nano-structured Systems Laboratory (MINAS) Università di Roma, Tor Vergata, Italy

References:

- Wang, Z., Kawakami, A., Uzawa, Y., (1997) *Physica C*, 282-287, p. 2465
- Wang, Z., Kawakami, A., (1995) *IEEE Trans. Appl. Supercon.*, 5, p. 2322
- Uzawa, Y., Takeda, M., Kawakami, A., Wang, Z., (2003) *IEEE Trans. Appl. Supercon.*, 13, p. 688
- Delaet, B., Villegier, J.C., Escoffier, W., Thomassin, J.L., Feautrier, P., Wang, I., Renaud-Goud, P., Poizat, J.P., (2004) *NIM A*, 520, p. 541
- Havey, K.S., Zabinsky, J.S., Walck, S.D., (1997) *Thin Solid Films*, 303, p. 238
- Yoshimori, S., Mizushima, K., Takey, S., (1996) *Supercon. Sci. Technol.*, 9, pp. A144
- Kang, L., Wu, P.H., Sh, J.R., Cai, W.X., Yang, S.Z., Ji, Z.M., Wang, Z., (2003) *Supercon. Sci. Technol.*, 16, p. 1417

Download: 0577.pdf