Dominant recombination center in electron-irradiated 3C SiC

Son N.T., Sorman E., Chen W.M., Singh M., Hallin C., Kordina O., Monemar B., Janzen E., Lindstrom J.L.

Dept. of Phys. and Msrmt. Technology, Link??ping University, S-581 83 Link??ping, Sweden; National Defence Research Institute, P.O. Box 1165, S-581 11 Link??ping, Sweden; Department of Physics, University of Hanoi, 90 Nguyen Trai, Hanoi, Viet Nam; Asea Brown Boveri Corporate Research, S-721 78 V??ster?s, Sweden

Abstract: Deep level defects and their role in carrier recombination processes in electron-irradiated 3C SiC have been studied by photoluminescence (PL) and optically detected magnetic resonance (ODMR). An isotropic ODMR spectrum, with a g value of 2.0061?0.0002 and an effective electron spin S=1/2, is observed in irradiated 3C SiC films. From the spectral dependence studies of the ODMR signal, the defect is shown to be a deep level center related to a radiation-iduced PL band with a zero-phonon line at 1.121 eV. Due to the competition between different carrier recombination channels, this ODMR spectrum can also be observed as a decrease of any other PL emissions from the sample, indicating its dominant role in recombination processes. ?? 1996 American Institute of Physics.

Year: 1996
Source title: Journal of Applied Physics
Volume: 79
Issue: 7
Page : 3784-3786
Cited by: 22
Link: Scorpus Link
Correspondence Address: Son, N.T.; Dept. of Phys. and Msrmt. Technology, Link??ping University, S-581 83 Link??ping, Sweden; email: Son@ifm.liu.se
ISSN: 218979
CODEN: JAPIA
Language of Original Document: English
Abbreviated Source Title: Journal of Applied Physics
Document Type: Article
Source: Scopus
Authors with affiliations:

1. Son, N.T., Dept. of Phys. and Msrmt. Technology, Link??ping University, S-581 83 Link??ping, Sweden, Department of Physics, University of Hanoi, 90 Nguyen Trai, Hanoi, Viet Nam
2. S??rman, E., Dept. of Phys. and Msrmt. Technology, Link??ping University, S-581 83 Link??ping, Sweden
3. Chen, W.M., Dept. of Phys. and Msrmt. Technology, Link??ping University, S-581 83 Link??ping, Sweden
4. Singh, M., Dept. of Phys. and Msrmt. Technology, Link??ping University, S-581 83 Link??ping, Sweden

5. Hallin, C., Dept. of Phys. and Msrmt. Technology, Link??ping University, S-581 83 Link??ping, Sweden
6. Kordina, O., Dept. of Phys. and Msrmt. Technology, Link??ping University, S-581 83 Link??ping, Sweden, Asea Brown Boveri Corporate Research, S-721 78 V??ster?s, Sweden
7. Monemar, B., Dept. of Phys. and Msrmt. Technology, Link??ping University, S-581 83 Link??ping, Sweden
8. Janz??n, E., Dept. of Phys. and Msrmt. Technology, Link??ping University, S-581 83 Link??ping, Sweden
9. Lindstr??m, J.L., National Defence Research Institute, P.O. Box 1165, S-581 11 Link??ping, Sweden

References:

1. De Balona, L.A.S., Loubser, J.H.N., (1970) J. Phys. C, 3, p. 2344
2. Itoh, H., Yoshikawa, M., Nashiyama, I., Misawa, S., Okumura, H., Yoshida, S., (1990) IEEE Trans. Nucl. Sci., 37, p. 1732
3. Itoh, H., Hayakawa, N., Nashiyama, I., Sakuma, E., (1989) J. Appl. Phys., 66, p. 4529
4. Itoh, H., Yoshikawa, M., Nashiyama, I., Misawa, S., Okumura, H., Yoshida, S., (1992) J. Electron. Mater., 21, p. 707
5. Itoh, H., Yoshikawa, M., Nashiyama, I., Misawa, S., Okumura, H., Yoshida, S., (1993) Inst. Phys. Conf. Ser., 137, p. 255
6. Nagesh, V., Farmer, J.W., David, R.F., Kong, H.S., (1987) Appl. Phys. Lett., 50, p. 1138
7. Choyke, W.J., (1977) Inst. Phys. Conf. Ser., 31, p. 58. , and references therein
8. Dang, L.S., Lee, K.M., Watkins, G.D., Choyke, W.J., (1980) Phys. Rev. Lett., 45, p. 390
9. Romanov, N.G., Vetrov, V.A., Baranov, P.G., (1986) Sov. Phys. Semicond., 20, p. 96
10. Kennedy, T.A., Freitas, J.A., Bishop, S.G., (1990) J. Appl. Phys., 68, p. 6170
11. Kordina, O., Bj??rketun, L.-O., Henry, A., Hallin, C., Glass, R.C., Huitman, L., Sundgren, J.E., Janz??n, E., J. Cryst. Growth (in Press)
12. Choyke, W.J., Feng, Z.C., Powell, J.A., (1988) J. Appl. Phys., 64, p. 3163
13. Lin-Chung, P.J., Li, Y., (1986) Mater. Sci. Forum, 10-12, p. 1247
14. Ioth, H., Yoshikawa, M., Nashiyama, I., Okumura, H., Misawa, S., Yoshida, S., (1995) J. Appl. Phys., 77, p. 837