

Optically detected magnetic resonance studies of defects in electron-irradiated 3C SiC layers

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Abstract: Defects in electron-irradiated 3C SiC were studied by optically detected magnetic resonance (ODMR). In addition to the isotropic L2 center previously reported, an ODMR spectrum labeled L3, with a trigonal symmetry and an effective electron spin $S=1$, was observed after annealing at 750 °C. The g values of the center along and perpendicular to the trigonal axis were determined as $g_{\parallel}=2.0041$ and $g_{\perp}=2.0040$. The anisotropy of the spectrum is accounted for by the spin-spin interaction with a crystal-field splitting value $D=4.2 \times 10^{-2} \text{ cm}^{-1}$. From a spectral dependence study of the ODMR signal, the defect is found to be related to a photoluminescence band in the near midgap region. The defect is likely a complex involving a silicon vacancy and another intrinsic defect as suggested from its trigonal symmetry and annealing behavior.

Year: 1997

Source title: Physical Review B - Condensed Matter and Materials Physics

Volume: 55

Issue: 5

Page : 2863-2866

Cited by: 20

Link: Scopus Link

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ISSN: 1631829

CODEN: PRBMD

Language of Original Document: English

Abbreviated Source Title: Physical Review B - Condensed Matter and Materials Physics

Document Type: Article

Source: Scopus

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