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To cite this version:
M. Eckstein, A. Jakubowicz, M. Bode, H.-U. Habermeier. OBSERVATION OF GETTERING PHENOMENA AT DEFECTS IN GaAs BY SIMULTANEOUS EBIC/CL MEASUREMENTS. Journal de Physique Colloques, 1989, 50 (C6), pp.C6-180-C6-180. <10.1051/jphyscol:1989634>. <jpa-00229665>

HAL Id: jpa-00229665
https://hal.archives-ouvertes.fr/jpa-00229665
Submitted on 1 Jan 1989

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OBSERVATION OF GETTERING PHENOMENA AT DEFECTS IN GaAs BY SIMULTANEOUS EBIC/CL MEASUREMENTS

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Both Electron-Beam-Induced Current (EBIC) and Cathodoluminescence (CL) offer the possibility to study defects in III-V compound semiconductors with a lateral resolution of about 1μm.

With a new method, which uses the simultaneous measurement of both signals, it is possible to distinguish between different influences on signal strength (defect structure, defect geometry, decoration etc.) and an excellent reconstruction of the defect geometry can be achieved(2).

Although this method is a very useful tool to characterize defects in direct gap semiconductors, there are some material dependent difficulties to measure the required signals when observing temperature-induced changes in defect recombination properties (degradation of contacts, surface contamination etc.). We have overcome these problems and in this paper we will report on the application of this technique to investigate the role of impurity gettering and decprecation on the recombination behaviour of defects in GaAs.

In our experiment we diffused Copper into the crystal. We observed an increase of the EBIC- and the CL-contrast and changes in the contrast profiles. With the help of computer simulations these experimental results can be interpreted as a homogeneous decoration of the defects and the formation of precipitates.

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