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**CATHODOLUMINESCENCE AND POSITRON ANNIHILATION STUDY OF DEFECT DISTRIBUTION  
IN III-V WAFERS**

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Positron annihilation (PA) is a sensitive technique for detection of vacancy-type defects in crystals, that has been widely used in recent years to study defects in semiconductors (1). On the other side, CL and other luminescence techniques have been applied (2) to study the defect distribution in semiconductor wafers. In some cases PA can be useful to interpret results obtained by CL-SEM (3). In this work PA and CL have been used to investigate the distribution and nature of defects in GaP:S, GaAs:Te and undoped SI GaAs wafers. CL intensity, dislocation density and vacancy concentration profiles have been measured. The latter has been obtained by positron lifetime measurements.

The results in GaP indicate that vacancies act as competitors of the green CL. From the evolution of CL intensity and positron lifetime during annealing experiments in electron irradiated GaP samples was concluded that P vacancies and not Ga vacancies are the main centers competing with the near band edge CL. Dislocation density has not been found to be directly related to vacancy concentration.

In the doped GaAs no spatial changes of positron trapping vacancies are detected but a higher vacancy concentration than in undoped SI GaAs is deduced from positron results. Band edge CL and dislocation density profiles in the wafers investigated have the same shape only in SI GaAs. Some of the results in doped crystals can be explained by the presence of impurity-vacancy complexes.

- 1) G. Dlubek and R. Krause, Phys. Stat. Sol. (a) 102, 443 (1987)
- 2) M. Tajima, in "Defects and Properties of Semiconductors: Defect Engineering", edited by J. Chikawa (Tokyo, Japan: 1987) p. 37
- 3) F. Domínguez-Adame, J. Piqueras, N. de Diego and J. Llopis, J. Appl. Phys. 63, 2583 (1988)