



HAL
open science

LASER ANNEALING OF Te IMPLANTED IN SILICON

J. de Bruyn, G. Langouche, M. van Rossum, M. de Potter, R. Coussement

► **To cite this version:**

J. de Bruyn, G. Langouche, M. van Rossum, M. de Potter, R. Coussement. LASER ANNEALING OF Te IMPLANTED IN SILICON. Journal de Physique Colloques, 1980, 41 (C1), pp.C1-433-C1-433. 10.1051/jphyscol:19801169 . jpa-00219656

HAL Id: jpa-00219656

<https://hal.science/jpa-00219656>

Submitted on 1 Jan 1980

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

LASER ANNEALING OF Te IMPLANTED IN SILICON ⁺

J. de Bruyn, G. Langouche^{*}, M. Van Rossum, M. de Potter and R. Coussement

Instituut voor Kern- en Stralingsfysika, University of Leuven, Physics department, B-3030 Leuven, Belgium.

Abstract.- Mössbauer spectra of ^{129m}Te implanted into Si have been studied earlier /1/. The spectra were composed of two lines which were interpreted as coming from Te in two different lattice sites. The intensities of the two lines were practically equal. The line with positive isomer shift was attributed to Te situated in a substitutional site and the other line with negative isomer shift to an interstitial Te. We have performed laser annealing on a $^{129m}\text{TeSi}$ source by a Q-switched ruby-laser with a pulse duration of 20-30 nsec and an energy density of 1.5 - 4.0 J/cm². This resulted in a drastic change of the relative intensity of the two Mössbauer resonance lines. The line with a negative isomer shift had increased up to about 75 % and the other one had decreased simultaneously to about 25 %. After increasing the laser power density a new Mössbauer line appeared and the lines were broadened. Channeling measurements by Foti et al. /2/ showed that the substitutional fraction had increased to about 80 % after laser annealing at 2.5 J/cm². Combining this with our results, the substitutional site should be attributed to the line with the negative isomer shift -2.5 ± 0.2 mm/s, which is in contradiction with the earlier interpretation of the two lines /1/. The new Mössbauer line might be explained by Te migrating to the surface after high power irradiation /2/.

References

- /1/ Hafemeister, D.W. and de Waard, H. Phys. Rev. B7 (1973) 3014.
/2/ Foti, G., Campisano, S.U., Rimini, E., and Vitali, G.,
J. Appl. Phys. 42 (1978) 2569.

⁺An extended article is accepted to be published in *Physics Letters A*.

^{*}Aangesteld navorser N.F.W.O.