



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
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Room Temperature (RT), 429 °C and 600 °C Ion implantation of Cadmium (Cd) in Glassy Carbon: Diffusion behavior and RAMAN Analysis

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**Abstract content
 (Max 300 words)**

The combination of ion implantation with nuclear methods such as Rutherford backscattering spectroscopy, high vacuum turbo furnace and RAMAN spectroscopy has shown to be well adapted to the investigation of impurity migration in pure carbons materials induced by either thermal annealing or irradiation. This paper gives some typical examples studied in more details in our laboratory. Among them, the determination of thermodynamical data (diffusion study) from the analysis of the evolution of implanted species is rather classical. As an illustration, the diffusion study of Cadmium implanted at room temperature into glassy carbon is presented. Room temperature implantation of 360 keV, Cd ions to a fluence of $2 \times 10^{16} \text{ cm}^{-2}$ produced an amorphous surface layer approximately 280 nm thick. This amorphous state was also confirmed by the Raman spectroscopy which was also used and the results are presented in this paper. Isochronal vacuum annealing for 1 hour in the temperature range 350 °C to 700 °C was performed. Broadening of the cadmium profile was observed at temperatures beyond 500 C. Isothermal vacuum annealing was also performed for annealing cycles of up to 4 hours for temperatures between 350 °C and 700 °C. The diffusion coefficients were calculated from the broadening of cadmium profiles.

**Apply to be
 consider for a student
 award (Yes / No)?**

No

**Level for award
 (Hons, MSc,
 PhD)?**

PhD

**Main supervisor (name and email)
and his / her institution**

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**Would you like to
 submit a short paper
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 Proceedings (Yes / No)?**

yes

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