

# Nanocrystalline diamond films grown at very low substrate temperature using a distributed antenna array microwave process: Towards polymeric substrate coating

## Objective

Deposit nanocrystalline diamond films on several substrates in a matrix array at low temperature (between 130 and 400 °C) using MOCVD. Compare the quality of films at each substrate temperature.

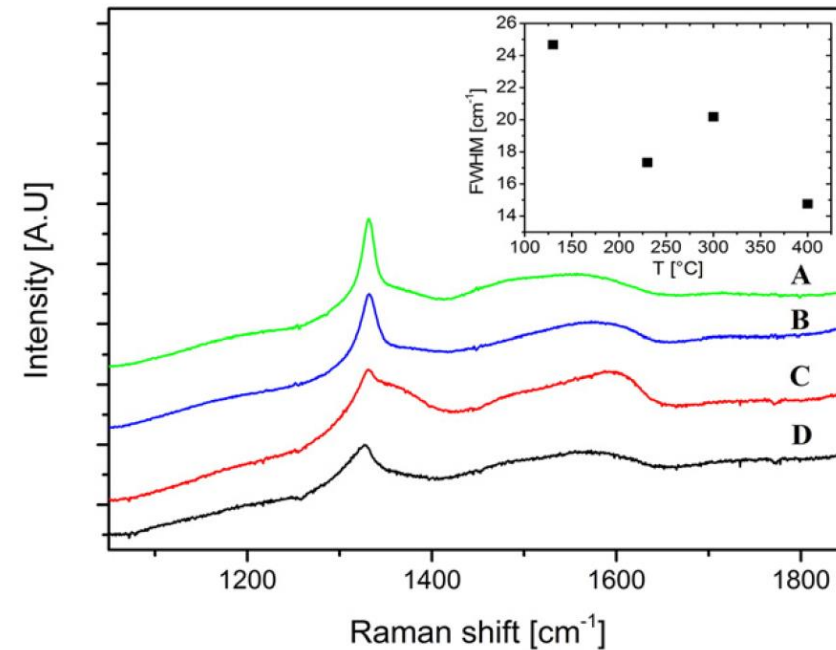
## Sample preparation

Polished (100) silicon wafers with thickness around 550  $\mu\text{m}$  were seeded by spin coating with 25 nm nanodiamond particles in colloidal solution. Then, those wafers were on an antenna array and films were deposited under standard conditions to grow NCD films with  $\text{H}_2/\text{CH}_4/\text{CO}_2$  as precursors. Microwave power was injected varying between 1.2 and 3 kW and causing a temperature variation.

## Data acquisition conditions

"The Raman spectra were obtained with a HR800 (HORIBA Jobyn-Yvon) working in a confocal mode and in the back-scattering configuration, using a continuous-wave diode-pumped solid state laser (CoboltblueTM) at 473 nm as an excitation source with a power of 50 mW."

## Representative figure /results



**Fig. 5.** Raman spectra of samples A, B, C and D grown at 400, 300, 230 and 130  $^{\circ}\text{C}$ , respectively. The inset figure shows the FWHM of the diamond peak at  $1332\text{ cm}^{-1}$  as a function of the growth temperature.

## Reference

B. Baudrillart, F. Benedic, T. Chauveau, A. Bartholomot, and J. Achard, "Nanocrystalline diamond films grown at very low substrate temperature using a distributed antenna array microwave process: Towards polymeric substrate coating", *Diamond and Related Materials*, vol. 75, pp. 44 {51, 2017, Special Issue \27th International Conference on Diamond and Carbon Materials DCM 2016", issn: 0925-9635. doi: <https://doi.org/10.1016/j.diamond.2017.01.001>. [Online]. Available: <http://www.sciencedirect.com/science/article/pii/S0925963516306604>.

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