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Using Raman Spectroscopy to Study Diamond Thin Films YI-HSUAN LIN, The College of New Jersey, ANDREW ZWICKER, Princeton Plasma Physics Laboratory — Diamond thin films (DTF), due to their extreme hardness, low electrical conductivity and chemical inertness, have various applications in semiconductor and machining industry. DTF strengthen machining and cutting tools that demand more precision and resist chemical corrosions as electrodes. The DTF created in this investigation were produced using a hybrid physical-chemical vapor deposition process in an electron cyclotron resonance sputter source. The samples formed can be amorphous carbon, graphite, or diamond. A method to test whether the sputter source successfully created diamond is Raman spectroscopy, a non-invasive technique that utilizes photo excitation and Raman scattering of monochromatic light. A sharp peak at 1332 inverse cm indicates the signature Raman shift of the sp3 C-C bond of pure diamond in these spectra. Graphite and amorphous carbon have their signature peaks near 1580 inverse cm and 1343 inverse cm. The technique is used to study wafer quality as a function of plasma parameters. Results will ultimately be benchmarked against Raman spectroscopy system at The College of New Jersey, and more samples will be produced to ensure the uniformity of the sputter source.

Yi-Hsuan Lin
The College of New Jersey

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