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Role of inert gas in the low-temperature CVD nano-crystalline diamond process. PARESH RAY, JELANI GRIFFIN, Jackson State University — We report a systematic investigation of the effect of different inert gases on chemical vapour deposition (CVD) of nano-crystalline diamond. *In situ* optical emission measurement was employed to monitor the plasma chemistry, which possibly influences the film growth. Our result indicates that C_2 is not necessarily the key growth species for nano-crystalline diamond and we will demonstrate here that the nano-crystalline diamond film can be grown under conditions where the C_2 concentration is very small. Modelling results support the trend in number density changes for intermediate radicals with the volume percentage of argon variation for $CH_4/H_2/Ar$ plasma.

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