# 온도 매개 변수의 컴퓨터 시뮬레이션을 통한 HF-CVD를 이용한 다이아몬드 증착 거동 분석
# Computer Simulation of Temperature Parameter for Diamond Formation by using Hot- Filament Chemical Vapor Deposition

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**초 록:** To optimize the deposition parameters of diamond films, the temperature, pressure, and distance between the filament and the susceptor need to be considered. However, it is difficult to precisely measure and predict the filament and susceptor temperature in relation to the applied power in the hot filament chemical vapor deposition (HFCVD) system. In this study the temperature distribution inside the system was numerically calculated for the applied powers of 12, 14, 16 and 18 kW. The applied power needed to achieve the appropriate temperature at a constant pressure and other conditions was deduced, and applied to actual experimental depositions. The numerical simulation was conducted using the commercial computational fluent dynamics software, ANSYS-FLUENT. To account for radiative heat-transfer in the HFCVD reactor, the discrete ordinate (DO) model was used. The temperatures of the filament surface and the susceptor at different power levels were predicted to be 2512 ~ 2802 K, and 1076 ~ 1198 K, respectively. Based on the numerical calculations, experiments were performed. The simulated temperatures for the filament surface were in good agreement with experimental temperatures measured using a 2-color pyrometer. The results showed that the highest deposition rate and the lowest deposition of non-diamond was obtained at a power of 16 kW.