

유리 기판위에 선택적 다이아몬드 박막의 증착과 입자 크기의 향상  
ENHANCEMENT OF THE SELECTIVITY AND THE GRAIN  
SIZE FOR THE DIAMOND FILM DEPOSITION ON GLASS  
SUBSTRATE

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Diamond films were deposited on the pretreated glass substrate in a MPECVD system. We made both the pretreated and the untreated areas on the glass substrate. To enhance the selectivity and the grain size, we introduced the cyclic process during the initial reaction. By comparing the surface images of the cyclic process with those of the normal process, we can obviously see the enhancement of the distinctness of the boundary lines by the cyclic process. It is noted that we can enhance the distinctness of the boundary lines, namely the selectivity of diamond film deposition, merely by the application of the on/off control of CH<sub>4</sub> flow rate for a relatively short time (10 min), compared with the total deposition time (6 h).

Using the high magnification SEM images, we examined the nucleation densities and the grain sizes of these nuclei as a function of CH<sub>4</sub> flow rates. Clearly, the result reveals the increase in the nucleation density on the pretreated surfaces by the cyclic process. Furthermore, the grain sizes of the nuclei were measured as ~0.7 micro-meter in diameter, indicating the increase in the grain size by the cyclic process. The cause for the increase in both the nucleation density and the grain size by the application of the cyclic process may attribute to the cyclic modulation of the H<sub>2</sub>/CH<sub>4</sub> concentration ratio. The results also reveal the enhancement of the diamond quality for the grain by the application of the cyclic process. The abundant amount of atomic hydrogen during the cyclic process seems to be the cause for the diamond quality enhancement of the grain by the cyclic process.