

P-59

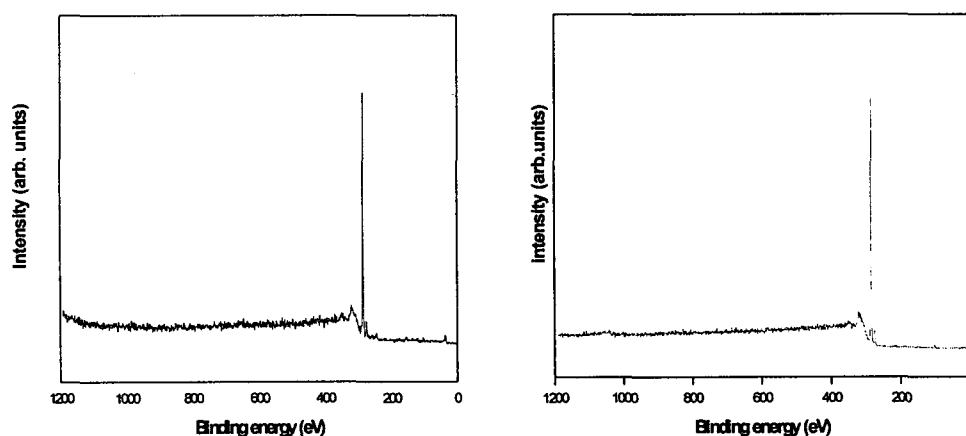
바이어스 부가에 따른 다이아몬드 핵생성에서 아르곤 혼합의 효과 Effect of argon dilution on diamond nucleation with bias enhancement

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Abstract

Diamond is well known as the hardest material in nature. It also has other unique bulk physical and mechanical properties, such as very high thermal conductivity and broad optical transparency, which enable a number of new applications now that large areas of diamond can be fabricated by the new diamond plasma chemical vapor deposition (CVD) technologies.

A study on the effects of growth kinetics and properties of diamond films obtained by addition of argon (~7 vol. %) into the methane/hydrogen mixture is carried out using HFCVD system. A negative bias was used as a nucleation enhancement method in addition to the argon dilution. The scanning electron microscopy (SEM) image of surface morphology shows well faceted crystallites with a predominance of angular shapes corresponding to <100> and <110> crystalline surfaces. The nucleation density and growth rate with argon dilution is two orders of magnitude higher than without argon deposition. The Raman spectra show a good quality film whereas XPS spectra show existence of only diamond phase.



Key words: HFCVD, Diamond, Argon addition.

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