

EARLY STAGES OF DIAMOND BEN-HFCVD ON IRIDIUM BUFFER LAYERS

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Three barriers have to be surmounted to achieve highly oriented diamond films in heteroepitaxy working in power electronic devices: the growth mode, the film adhesion and the doping control. At the present time, the most promising substrate remains iridium, Schreck et al. reported polar and azimuthal components of the film misorientation included between 0.4 and 0.6° [1]. To realize further progress in the crystalline quality, new improvements of CVD techniques have to be combined with a deeper knowledge of the mechanisms responsible for the diamond orientation. Surprisingly, the mechanisms involved in the oriented growth and the interface formation are poorly understood [2, 3].

This study attempts to provide answers concerning the effects of BEN step on diamond nucleation on iridium buffer layers by the use of in situ electron spectroscopies (XPS, AES, EELS). Moreover, the morphology of the samples was further characterised by ex situ AFM and SEM FEG (Fig 1.). Raman and Nano-Auger investigations provide informations about the chemical nature of the crystals. Effects of each step of the process (etching, BEN and CVD growth) on the chemical state as well as the surface topography will be discussed.

References

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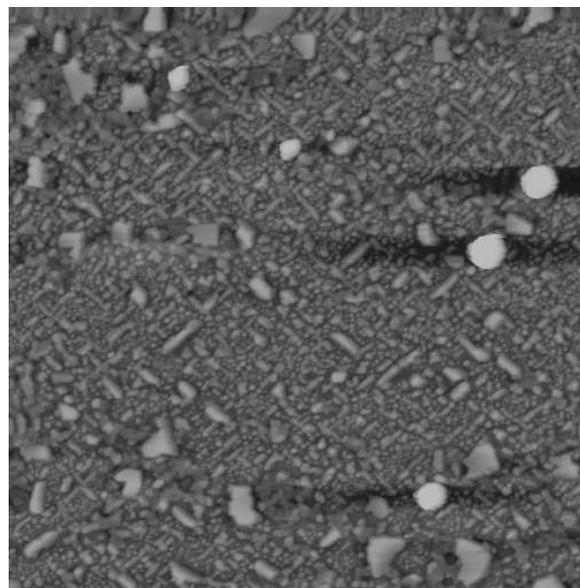


Fig. 1 AFM (8×8) μm² image showing the surface morphology after the BEN-HFCVD synthesis