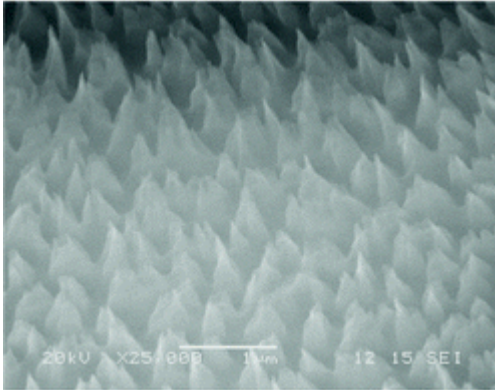


Transparent and Flexible Field Electron Emitters Based on the Conical Nanocarbon Structures

Abstract



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The fabrication of conical nanocarbon structures (CNCs) on a transparent and flexible nafion substrate at room temperature using an ion irradiation technique and their application toward field emission displays (FEDs) have been demonstrated. The main advantage of this technique is that CNCs can be fabricated directly on the transparent substrate while retaining the transparency of the substrate. A scanning electron microscopy (SEM) image revealed that the sputtered surface was entirely covered with CNCs with a calculated numerical density of $6 \times 10^6 / \text{mm}^2$. Such nafion based CNCs have proved to be an effective electron emitter with turn-on and threshold fields of 6.1 and 9.5 V/ μm , respectively. The field enhancement factor was estimated to be 1020 from the Fowler–Nordheim (F–N) plot. Thus the room temperature fabricated CNCs based on transparent and flexible nafion substrate would be very promising for future flexible (roll-up) and transparent FEDs.