

The study on the field enhancement factor of carbon nanotubes field emitters

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The analytical expression of enhancement factor for an individual carbon nanotube (CNT) field emitter has been obtained by calculating the electrical potential and field at the end of the individual CNT with the image charge model. The results showed that the aspect ratio is of big influence to the enhancement factor. We then further carried out calculation on the aligned CNT arrays system and obtained some of the optimized conditions that can be utilized to improve the field emission performance of aligned CNT arrays. We found that in spite of small modulation to the field emission performance by changing the anode-cathode distance, reduction of threshold voltage and operating voltage could be achieved by decreasing the anode-cathode distance, which makes it appealing for real applications.