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The Preparation of Vertically Standing Graphene Sheets on ITO Glass and Their Field Emission Properties

The cold cathodes based on the low-dimensional nanoscale materials have exhibited excellent field emission (FE) properties in contrast with the traditional materials. The synthesis control of low-dimensional nanoscale materials, such as morphology, orientation, density, and interval, has become the key technology in higher efficient and size-reducing flat field emission displays. Among them, the vertically standing graphene sheets (VSGs) are a promising candidates as cold cathode materials applied in FE display devices because they have plenty of high exposed atomic edges, larger aspect ratio, excellent thermal conductivity and good mechanical properties.

Here, we reported that the large area and high densities VSGs directly on indium tin oxide (ITO) were prepared at low temperatures by using PECVD method. The morphology, structure and size of the VSGs grown at different temperature were characterized. Furthermore, the field emission properties of VSGs/ITO films at different grown temperature have been compared. The VSGs/ITO film grown at higher temperature (600℃) had a larger field-enhancement factor and smaller turn-on field because of more field-emission sites and better electrical conductivity. The results indicate that the high quality of VSG film and its promising application for large-area field emitters.

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