

Fractal carbon films deposited by ethanol chemical vapor deposition

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Various carbon films, such as diamond, diamond-like carbon films, tetrahedrally bonded amorphous carbon films, nanocrystalline diamond, nanocrystalline or nanocomposite carbon films, and carbon nanotubes films, which may be undoped or doped, is of commercial interest due to their application in vacuum microelectronics devices. For instance, they can be used for large-area flat-panel displays, accelerator, etc. For electron emission source, these carbon films must be deposited directly on metal substrates which can be employed as cathode for electron emission. Various preparation methods, such as plasma-assisted chemical vapor deposition, hot-filament CVD, and electrodeposition have been developed to produce carbon films. In this paper, we present fractal carbon films deposited on copper plate by chemical vapor deposition.

We employed scanning electron microscopy, transmission electron microscopy, and Raman spectroscopy to characterize the deposits. The thick of the fractal carbon film was a few micrometers. According to Raman spectrum, we know the films exhibit low graphitization. According to SEM observation, we find there are many protuberances on the film surface. We also employed atomic force microscopy (AFM) to characterize the film. The AFM image also shows that the film has fractal morphology.

Due to directly grow on metal substrate and possess protuberances on film surface, it is fit for application as electron source.

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