Technology Employed for Materials development in electron sources and electron microscopy

Title: Development of novel electron sources based on composite materials

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Abstract:

In the last forty years our group exerted considerable efforts to develop new composite materials in our search for novel powerful, stable and bright electron source. Electron microscopy was widely used as a technique to characterize the material properties in various research fields such as Physics, Chemistry, Medicine, etc. Transmission electron microscopy (TEM) uses beam of electrons to hit the sample, this beam penetrate though the sample and give information about film thickness coating or in studying the microstructure of the materials used. Or, using scanning electron microscopy (SEM) where the electrons interact with atoms on the surface and give information about the sample topography. To achieve high-quality images, the source of the electron beam must be optimized. In this study, various electron sources were studied and different types of coatings were used to achieve a highly focused, long life time and stable electron sources.

Distinguished results showed the differences lie behind the materials used and coatings employed. Field electron emission from Multi walls carbon nano tubes showed unprecedented emission power.