Applications of Functionalized Carbon Nanotubes as Electron Emitters and Beyond

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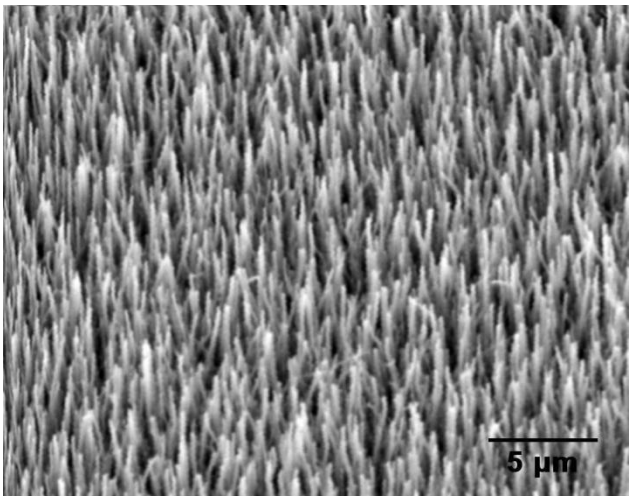
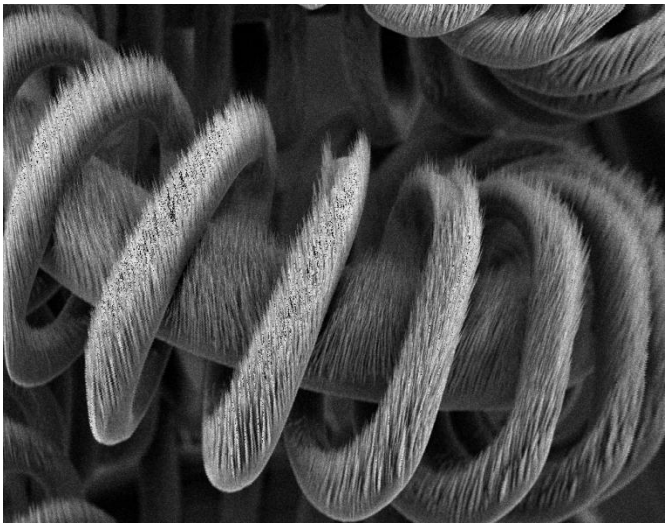
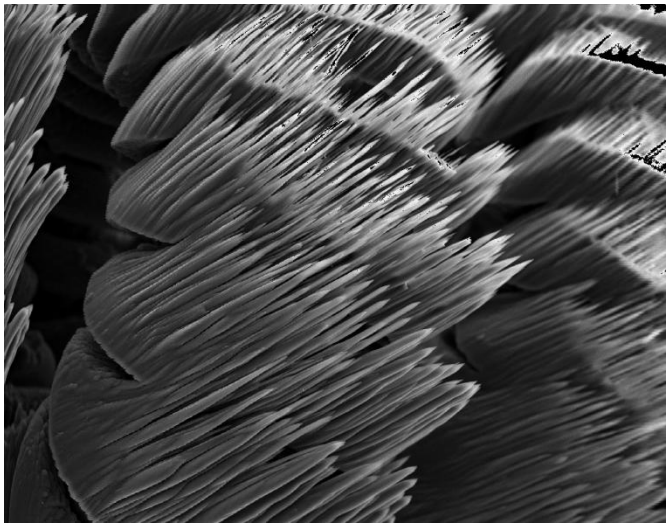


Carbon nanotubes (CNTs) are natural field emitters; their unique geometry and high aspect ratio give rise to a high field enhancement factor β. The field emission properties of CNTs have been extensively studied in recent years. However, there are few reports on the thermionic emission properties of CNTs in the literature. The benefit of the large field enhancement factor introduced by CNTs has not been exploited for thermionic emission applications. In this talk, I will present a new thermionic emitter based on functionalized CNTs and its superior electron emission properties. This new thermionic emitter consists of CNTs with a low work function oxide surface coating. The basic idea is to combine the benefits of the large field enhancement factor introduced by CNTs and the low work function from the oxide coating, and thus to induce a strong field enhanced thermionic emission which has been overlooked in the past. Detailed fabrication techniques for the emitter structure will be presented, as well as their applications in electron sources and thermionic energy converters. Other potential applications of functionalized CNTs in power electronics and sensors will also be discussed.





4pm Friday April 3rd
123 Nussbaum Science Center
(refreshments at 3:45pm)