

## **In situ K-doped SWCNTs synthesis by hydrogen arc-discharge method and their field emission properties**

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K-doped single-walled carbon nanotubes (SWCNTs) were directly synthesized by hydrogen arc-discharge method using Fe catalyst. The K-doped carbon material indicated high-purity SWCNTs about 90% without amorphous carbon materials. The K-doped SWCNTs showed the diameters of 1.4-2.0 nm from TEM observation. By simple purification method which consists of a thermal oxidation in air ambient and acid treatments, amorphous carbon materials and metal catalyst particles on the surface of SWCNTs were effectively removed. For the field emission properties, K-doped SWCNTs showed much lower turn-on voltage of 0.7 V/ $\mu\text{m}$  and the higher emission current density of 1 mA/cm<sup>2</sup> at an applied field of 1.5 V/ $\mu\text{m}$  compared with the undoped SWCNTs. Moreover, K-doped SWCNTs indicated stronger emission stability than that of undoped SWCNTs.