

Fabrication of high performance far ultraviolet(UV) light sources with carbon nanotube cold cathode pumping

Sung Tae Yoo and Kyu Chang Park

*Department of Information Display and Advanced Display Research Institute,
Kyung Hee University, Seoul 130-701, Korea
Kyupark@khu.ac.kr*

Choon Tae Sul*

** World Beam Solution Co. Ltd, Dongdaemoon-ku, Seoul, Korea*

We fabricated high performance far ultraviolet (UV) light with carbon nanotube (CNT) cold cathode electron beam (C-beam). Far UV light generated with high energy electron beam irradiation on wide bandgap anode. The excitation wavelength depend on the bandgap energy of anode materials. Power efficiency of far-UV light depend on the performance of CNT cold cathode electron beam (C-beam). Also, the thickness of anode layer is related on the efficiency of UV light excitation. For this far UV light generation, we manufactured electron beam irradiation system with 35x35 mm² anode area. Typical cathode area for electron extraction is 15x15 mm². And anode bias and current is 10 kV and 0.2 mA, respectively.

With 200 nm AlN thin films on Sapphire substrate, we could achieved UV light with 280 nm peak, and irradiance of 5 mW/cm² with 2W (10 kV and 0.2 mA) irradiation. The irradiance depend on the anode bias and increases with anode bias up-to 15 kV. Also, irradiance and power efficiency depend on the thickness of anode thin films.

In this presentation, we will report on the far UV light generation technique, fabrication process of C-beam, electron emission characteristics of the CNT emitters, and the performance of UV light with irradiation conditions would be discussed.