Growth of nanoscale deposits on surfaces under the influence of high electric fields or light intensities during operation in organic gas environments

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ABSTRACT

Many publications reported the growth of nanoscale depositions originated from ambient carbon containing residual gases during operation of field emitters manufactured from different materials [1], [2]. The carbonous accumulations form three dimensional structures in direction of the sharpest emitter tips which are also sites of highest electron emission probability. Similar deposits were observed in literature for semiconductor lasers e.g. [3],[4]. In this case the nanoscale deposits were found at the regions of highest light intensity. We carried out experiments to investigate the influence of the deposition on field emission structures as well as on semiconductor lasers depending on different gas environments. Due to the small size and quantity of the deposited structures, it is very difficult to analyse the material in order to determine the composition of the structures and compare them with each other. In this article we want to compare different possibilities and show the advantages and disadvantages.

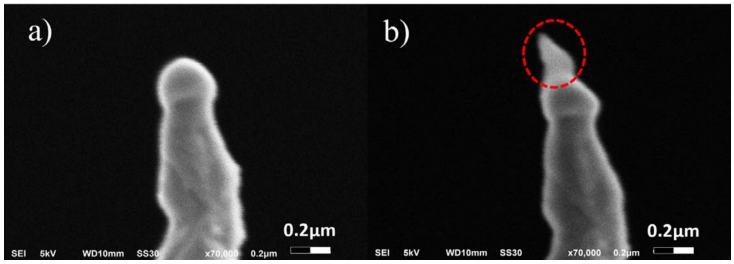

Figure 1: Tungsten Field Emitter Tip a) before operation in organic gas environment b) after operation

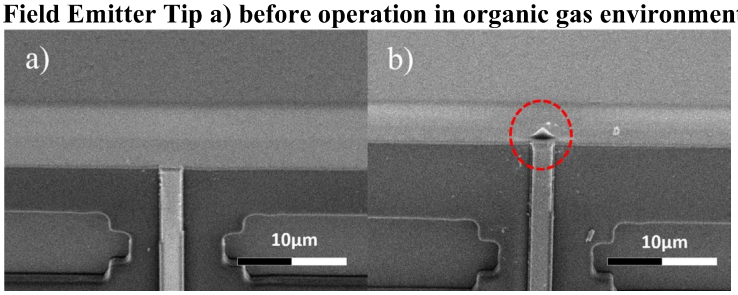

Figure 2: Semiconductor Laser Device a) before operation in organic gas environment b) after operation

References

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