Laser Micromachining Processes in Formation of Microtip Field-Emission Cathodes

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Paper describes the method of creating the sharp emitting tips on the surface of a field-emission cathode. The needle-shaped structures with a high aspect ratio on the glass-carbon plate are produced by means of nanosecond laser micromachining.

The operations of laser scribing, milling, engraving (marking) and cleaning were applied for fabrication of the single- and multi-ray field-emission cathode. The special technique of laser engraving provided high tips with sharp and smooth apexes.

As a result we obtained the tips with aspect ratio up to 700. The tests of cathodes showed that high density of current emission and a shorter technological route of production to be reached.