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ABSTRACT



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A cold-electron emitting element according to the present invention comprises emitters formed by performing etching to a columnar polycrystalline film (2) which comprises columnar crystalline grains (4) being deposited on a substrate (1) along a same crystal axis.

By the cold-electron emitting element, the uniformity of the emitter shape can be obtained with good reproducibility even when a large number of emitters are formed, variations in the electron emission characteristics due to variations in the emitter shape can be suppressed, and further the uniform emission characteristic can be realized on a large-area substrate.