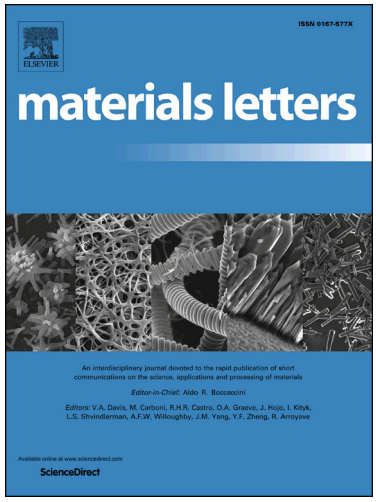

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Fabrication and photoluminescence performance of porous gallium nitride luminescent materials using different 1-ethyl-3-methylimidazolium-based ionic liquids

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Abstract

Porous gallium nitride (GaN) luminescent materials were fabricated by photoelectrochemical etching using three different 1-ethyl-3-methylimidazolium ([EMIM])-based ionic liquids as the etchants. The as-etched porous GaN presents honeycomb shape, deep gully with some holes in the surroundings, and overlapping hole structure, which are significantly different from the planar GaN. Moreover, photoluminescence (PL) spectra indicates that the porous GaN has more excellent PL performance than the planar GaN. In general, reducing the etching time to 1 minute, the PL intensity of porous GaN etched by [EMIM][OTF] is 9.27 times than that of the planar one. These results suggest that porous GaN etched by ionic liquid can be an outstanding substrate in the field of the luminescent material.

Keywords: Porous materials; Photoelectrochemical etching; Ionic liquid; Luminescence