

Ultraviolet Lasing from Vertically-Aligned ZnO Nanowall Array

Authors : Masahiro Takahashi, Kosuke Harada, Shihomi Nakao, Mitsuhiro Higashihata, Hiroshi Ikenoue, Daisuke Nakamura, Tatsuo Okada

Abstract : Zinc oxide (ZnO) is one of the light emitting materials in ultraviolet (UV) region. In addition, ZnO nanostructures are also attracting increasing research interest as building blocks for UV optoelectronic applications. We have succeeded in synthesizing vertically-aligned ZnO nanostructures by laser interference patterning, which is catalyst-free and non-contact technique. In this study, vertically-aligned ZnO nanowall arrays were synthesized using two-beam interference. The maximum height and average thickness of the ZnO nanowalls were about 4.5 μm and 200 nm, respectively. UV lasing from a piece of the ZnO nanowall was obtained under the third harmonic of a Q-switched Nd:YAG laser excitation, and the estimated threshold power density for lasing was about 150 kW/cm². Furthermore, UV lasing from the vertically-aligned ZnO nanowall was also achieved. The results indicate that ZnO nanowalls can be applied to random laser.

Keywords : zinc oxide, nanowall, interference laser, UV lasing

Conference Title : ICOPE 2015 : International Conference on Optics, Photonics and Electronics

Conference Location : Prague, Czechia

Conference Dates : March 23-24, 2015