Faculty of Science and Technology
Tokushima University

Study and Development of Advance Optical Nanomaterials

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Development of Advance Optical Nanomaterials

Figure (a) : Nanostructures prepared by laser ablation

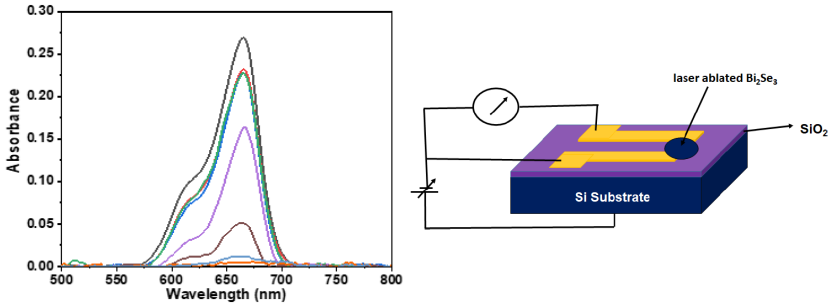

Figure (b) : Photocatalysis and Field effect transistor

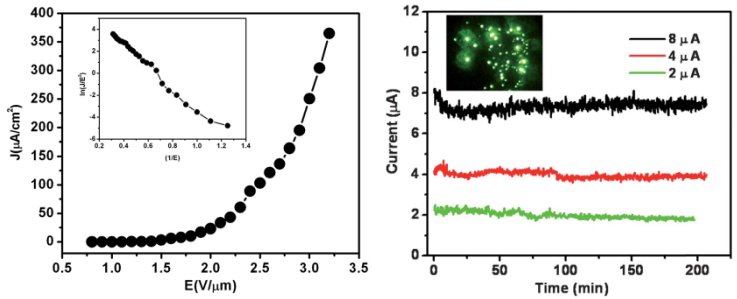

Figure (c) : Typical I-V and I-T plots with emission image

Content:

The nanomaterials have the potential for a variety of applications in optoelectronics, photocatalysis, and energy related devices due to their enhanced physical, chemical, and optical properties. The two-dimensional (2D) nanomaterials (such as MoS_2, WS_2, Bi_2Se_3, In_2Se_3) can be prepared by laser ablation in a liquid medium as shown in figure (a). These nanomaterials with different sizes and shapes lead to favored surface properties useful for demanding optoelectrical application.

The photocatalytic activity and field-effect transistor behavior from 2D nanomaterials can be studied to investigate the effect of the structural modification as shown in figure (b). Especially, the bulk topological insulator which transformed into semiconducting nanomaterials shows superior properties for the desired application in optoelectronics.

We also studied the field emission investigation on 2D nanostructures with different sizes and shapes. The field emission current versus applied voltage (I–V) and emission current vs. time (I–t) characteristics is shown in figure (c). The promising field emission properties shown by nanostructures lead them to play an excellent role in field emission displays (FEDs).

Keywords : 2D Nanostructures, Laser ablation, Photocatalysis, Field emission displays

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