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HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
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Judul Karya Ilmiah (Prosiding) : The Possibility of Geothermal Permeability Detection by Using Seismic Refraction Method
 Nama/ Jumlah Penulis : 3 Orang
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Semarang, 8 Maret 2023

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 NIP. 196511231994031003
 Unit Kerja: FSM Universitas Diponegoro
 Bidang Ilmu: Fisika

Reviewer 2



Dr. Drs. Catur Edi Widodo, M.T.
 NIP. 196405181992031002
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 Bidang Ilmu: Fisika

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Unit Kerja : Fakultas Sains dan Matematika
Bidang Ilmu: Fisika

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Jatirunggo geothermal field is a hot spring manifestation with temperatures ranges 35°C-38°C. Previous research by the resistivity method concluded that the Jatirunggo field as an outflow zone of a geothermal system. This study aim is demonstrating the possibility of the permeable geothermal zone detection by using seismic refraction method's a complement of the geothermal conceptual model-the main research method by conducting refraction seismic. The method mainly applying active seismic

wave to the media and identify the velocity properties of the pathway as a recording logger used 2D geode module which is consisting of 8 channels geophone by 5 meters geophone interval. The penetrating depth can reach 15 m-20 m. Processing of velocity model has been used Hagiwara algorithm of 2 layers. The result shows velocity seismic recorded has a range of 138 m/s of topsoil layer up to 1742 m/s on the second layer. Based on the velocity model we can interpret the existence of a fault structure corresponding to the emergence of the hot springs, but the method was impenetrable up to the structured target. © Published under licence by IOP Publishing Ltd.

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National Institute of Physics, College of Science, University of the Philippines
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Abstract. In this work, we demonstrate the NIP's all in-house development of a vertical cavity surface emitting laser structure. The VCSEL structure grown via MBE consists of an AlAs/AlGaAs distributed Bragg reflector and an AlGaAs/GaAs quantum well designed to issue at the 850 nm region. Reflectance spectroscopy showed that the stop band is centered around the designed wavelength. The electroluminescence spectra displayed that the maximum light emission corresponded to its design. This is a crucial step in the NIP's development of semiconductor lasers, leading towards future high-speed and highly-tunable VCSEL devices.

1. Introduction

Semiconductor lasers have been at the forefront of high-speed interconnects, thanks to the development of lasers capable of operating at gigahertz speeds [1]. Expansion to other applications such as proximity sensing [2] and light detection and ranging (LIDAR) [3] have driven further research on this field. For high-speed devices, switching speeds at the gigahertz range are desired [1], while high tuning speeds and increased tunability are sought for wavelength-tunable devices [4]. With its molecular beam epitaxy (MBE) and device fabrication facilities, the National Institute of Physics (NIP) has recently renewed its research thrust in this field, most notably on vertical cavity surface emitting lasers (VCSELs).

The VCSEL is a type of semiconductor laser with light emission orthogonal to the wafer plane. Its main advantages over other conventional semiconductor lasers such as edge-emitting lasers are the ease of coupling to optical fibers, direct wafer scale probing and low threshold operation [5]. A standard VCSEL design is composed of an optical cavity with an active region in the center, which is usually a quantum well (QW). The optical cavity is then sandwiched between two distributed Bragg reflectors (DBRs), which are highly reflecting mirrors composed of alternating high and low refractive index medium materials. The stop band of the DBR, which is the wavelength region with the highest reflectance, should coincide with the QW emission wavelength. Oxidation apertures, usually situated near the active region, are also employed for optical and current confinement [6].

In this paper, we report on the all in-house development of an AlGaAs/GaAs-based DBR VCSEL structure at the chip level. The whole process entails the whole production processes: the growth of the layers, device fabrication, and characterization of both as-grown and device-fabricated layers. Oxidation was also performed to explore the possibility of current and optical confinement effects [6].

2. Experimental Details

