

**THE SURFACE MORPHOLOGY STUDY ON POROUS SILICON
(PS) DOPED ERBIUM(Er)**

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Partial Fulfilment of the Requirement for the
Degree of Bachelor of Science (Hons.) Industrial Physics
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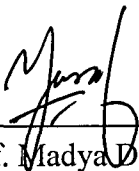
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This Final Year Project Report entitled “**Surface Morphology Study of Porous Silicon (PS) Doped Erbium (Er)**” was submitted by Hafsa Omar, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Industrial Physics, in the Faculty of Applied Sciences, and was approved by

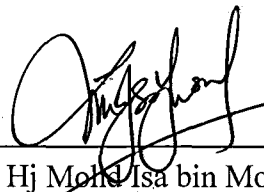


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ABSTRACT

SURFACE MORPHOLOGY STUDY OF POROUS SILICON (PS) DOPED ERBIUM (Er)

Porous silicon (PS) is a porous structure prepared on a silicon substrate. In this research, the method in preparing the porous silicon is electrochemical etching with current density $20\text{mA}/\text{cm}^2$ and voltage 100V within 20 minutes. Hydrofluoric acid (HF) solution with ethanol was used as electrolyte with ratio 1:1. PS have less application compared to porous silicon that been doped with other impurity such as in this research we used Erbium (Er) as the dopant. The PS sample was doped with Er using the method of dopant deposition and annealed at 300°C for 1 hour for different weight of Erbium. The weight varied from 0.01g, 0.02g, 0.03g until 0.04g. Surface morphology of PS sample and PS sample doped Er was studied using Scanning electron microscopy (SEM) and the composition of element were studied using X-ray diffraction (XRD) and Fourier transform infrared spectroscopy (FTIR). The surface morphology study on PS sample shows that porous structure form uniformly on the silicon substrate and PS sample doped with Er shows homogeneous surface for 0.03g. From the EDX analysis, the element of Er composition in PS sample doped Er shows the highest weight percentage of Er penetrate into the Ps is at 0.03g which is 26.69%. In FTIR analysis indicate that there is change in peak and for PS sample doped with Er shows that there is a vibrational impurity at 421 cm^{-1} and 435cm^{-1} to show that Er penetrate into the PS. Lastly is the XRD analysis shows an increasing of intensity count at 30° .