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Judul Karya Ilmiah (Artikel) : Assessment and Characteristic of Extracorporeal Shock Wave Lithotripsy (ESWL) Success Rate in Urolithiasis: Report in Kariadi General Hospital Semarang Indonesia

Jumlah Penulis : 3 Orang
Status Pengusul : **Eriawan Agung Nugroho**, Antonio Paulus Aditya Nugroho and Leonardo Cahyo Nugroho

Identitas Jurnal Ilmiah : a. Nama Jurnal : Novel Research in Sciences (NRS)
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c. Vol, Nomor, halaman : vol 1 issue 4, p: 1-4
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Aunik Rahman¹, Shinji Ueyama² and Anis Rahman^{1*}

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Eriawan Agung Nugroho^{1*}, Antonio Paulus Aditya Nugroho² and Leonardo Cahyo Nugroho²

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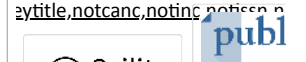
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Abstract

Terahertz reconstructive imaging technique has been used for measuring patterns on silicon chips that are hidden under top layer. The terahertz nanometrology described herein is a non-destructive, camera-less route of imaging both the surface and sub-surface features on a semiconductor chip and/or on other substrates. Two different chips (Sample-A and Sample-B) were investigated to demonstrate the power of the terahertz nanometrology technique for measuring different patterns via imaging and graphical analysis. It was found that the dot pattern of Sample-A varied both in size and spacing; typical dot size is $\sim 2.4\mu\text{m}$ and typical dot spacing is $\sim 4\mu\text{m}$. The dot pattern on Sample-B was relatively uniform; approximate size is $4.5\mu\text{m}$. The surface imperfection of Sample-B was clearly visualized via the same imaging technique. In addition, 3D metal lines on a silicon chip have been measured for their line width, line pitch, and line depth. The results obtained from terahertz image analysis agree within the experimental error limits with those obtained via scanning electron microscope imaging.

Keywords: Terahertz reconstructive imaging; camera-less 3D (volume) imaging; Nanometrology; Semiconductor chips; Hidden patterns

Abbreviations: CCD: Charge Coupled Device; SEM: Scanning Electron Microscope; TEM: Transmission Electron Microscope; ADL: Abbe Diffraction Limit; TNS3DI: Terahertz Nanoscanning Spectrometer and 3D Imager

Introduction

Camera-less imaging technology and spectrometry via terahertz route can play a tremendous role in the advancement of nanometrology for semiconductors and for nanomaterials in general. Imaging of any kind with a camera depends on a physical parameter known as the "Abbe diffraction limit," (see Figure 1) that sets the highest resolution achievable as half of the wavelength of the light used for imaging. For example, electron microscopes use electrons for imaging. Electron wavelength is in Pico-meters; therefore, electron microscopes can image atomic planes ($\sim 0.1\text{nm}$). This rule is the "bible" for imaging since 1873 as was set by Ernst Abbe [1]. Scientists have been trying to break this limitation over many decades [2]. For the semiconductor industry, for example, accurate measurement of features on a wafer—that is reaching the realm of a few nanometers—is of paramount importance for the performance and yield improvement of the modern semiconductor chips. Recently, it has been demonstrated by Rahman et al. [3] that the Abbe diffraction limit (ADL) may be overcome via a reconstructive imaging route, where the focusing lens and the focal plane array of a camera (e.g. a charge coupled device, "CCD") was replaced by a smart nano-scanner and a computer algorithm for generating high resolution images. This gives the freedom of defining one's own pixel size without being restricted by the camera's recording mechanism such as the CCD. Moreover, the use of terahertz in the above technique allows one to inspect under the surface via non-destructive route. In contrast, the current metrology techniques, such as the scanning electron microscope (SEM), transmission electron microscope (TEM), atomic force microscope (AFM), and light microscopes, though established, are destructive in many cases, require tedious and time-consuming sample preparation for effective investigations. Additionally, all of these established techniques produce a frozen-in-time image of a single surface. A semiconductor wafer, for example, must be cut for inspection across its thickness.

Purple Sweet Potato Takes on Colon Cancer

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Case Report

After cardiovascular disease, cancer is the second leading cause of death in the Western world. The World Health Organisation estimates that one third of all occurrences of cancer are preventable, largely through the cessation of smoking, but also by dietary modification and prevention the exposure to carcinogens. (<http://www.who.int/cancer/en/>). The role of diet in the aetiology of cancer has been established in many epidemiological studies including the protective effect of diets high in fruit and vegetables. Anthocyanin rich foods have been shown to be chemopreventative in many animal models of cancer, and epidemiological evidence suggests they can also function in this role in humans. In my study, the potential chemopreventative properties of Purple Sweet Potato (PSP), called Kumara in New Zealand, which contains high levels of anthocyanins and can realistically be consumed in the human diet in larger quantities than most other anthocyanic foods, were investigated. The ability of PSP to prevent adenoma formation in the APC^{MIN} mouse, which is a genetic model of Colorectal cancer (CRC), along with the potentially underlying mechanisms of action, was examined.

Reductions in polyp numbers in APC^{MIN} mice have been reported previously with a variety of pharmaceutical or dietary regimes. Hydroxymatairesinol (HM-3000) was reported to reduce polyp formation in APC^{MIN} mice due to the antioxidant activity of HM-3000. Selenium-enriched broccoli reduced the polyp number in APC^{MIN} mice by 30.7%, an effect attributed to enhanced I κ B expression which would decrease Nuclear Factor- κ B (NF- κ B) activation. Specific inhibition of Cyclooxygenase-2 (COX2) by rofecoxib and inducible Nitric Oxide (iNOS) by aminoguanidine, as well as knockout of these, has been shown to inhibit polyp formation in APC mutant mice. Xenobiotics Metabolized Enzymes (XME) activity has been demonstrated to be modulated by a variety of compounds, including curcumin, which has also been shown to reduce polyposis in APC^{MIN} mice.

In the present study, diets supplemented with PSP: flesh, skin or Anthocyanin Rich Extract (ARE) all gave substantial reductions in polyp numbers in APC^{MIN} mice of approximately two thirds or more and reduced DNA damage in leukocytes, inhibited NF- κ B activation in splenocytes, reduced COX2 and iNOS expression in liver tissue, lowered hepatic Cytochrome 450 (CYP450) levels and improved hepatic Glathione S transferase (GST) levels. The individual contributions of all these effects towards the reduction in polyp formation in the APC^{MIN} mouse consuming supplemented diets were observed, and an argument could be made for any one of these effects being responsible for the reduction in polyposis. However, it seems likely that the powerful chemopreventative properties of the PSP supplemented diets in the APC^{MIN} mouse are a combination of all these effects, perhaps explaining why the magnitude of polyp reduction is higher than those reported for many other agents. The active compound or compounds in the present Kumara may be modulating each of these effects independently. However, central to the development of polyps in the APC^{MIN} mouse is the mutation of the APC gene. APC normally targets κ -catenin for phosphorylation, ubiquitination and degradation, preventing free κ -catenin from accumulating. If APC is not functional, free κ -catenin acts as a transcription factor, initiating expression of a variety of genes. κ -catenin