

INTISARI

PENGEMBANGAN SISTEM SENSOR BERBASIS *SURFACE PLASMON RESONANCE* (SPR) YANG *REAL-TIME* TEROTOMATISASI DAN BERESOLUSI TINGGI.

FEBRILIAN DWI LAKSONO
13/348780/PA/15484

Telah dikembangkan sistem sensor berbasis *surface plasmon resonance* (SPR) yang *real-time*, terotomatisasi, dan beresolusi tinggi. Pengembangan sistem terdiri dari sistem mekanik instrumen, sensor daya laser, dan antarmuka pengguna. Pengembangan sistem mekanik menggunakan desain *gear anti-backlash*, telah berhasil meningkatkan resolusi sudut datang laser hingga $0,01^\circ$. Pada sistem ini, sistem pengakuisisian detektor laser dan motor stepper dikendalikan menggunakan Arduino Uno yang mudah diprogram, fleksibel, dan murah. Selanjutnya, digunakan antarmuka penggunaanya LabView sebagai *virtual instrument* untuk mempermudah pengukuran sampel dan menyimpan data pengukuran langsung dalam bentuk digital. Pengujian menggunakan prisma setengah lingkaran yang telah didepoisikan emas menunjukkan sudut *Total Internal Reflection* (TIR) $41,34^\circ \pm 0,01^\circ$ dan sudut SPR $44,20^\circ \pm 0,01^\circ$. Hasil pengujian menunjukkan bahwa sistem yang dikembangkan juga dapat mereduksi waktu pengukuran dan kesalahan pencatatan karena *human error*. Sebagai tambahan, dari hasil pengujian dapat disimpulkan bahwa sistem pengukurannya *repeatable*, akurat, dan mendekati simulasi berdasarkan teori.

Kata kunci: *Surface Plasmon Resonance*, *Virtual Instrument*, otomatisasi, *repeatable*, resolusi tinggi, instrumen SPR.

ABSTRACT

SYSTEM DEVELOPMENT OF SURFACE PLASMON RESONANCE (SPR) BASED SENSOR THAT REAL-TIME AUTOMATED AND HIGH RESOLUTION.

FEBRILIAN DWI LAKSONO
13/348780/PA/15484

A system of surface plasmon resonance (spr) based sensor that real-time automated and high resolution has been developed. The developed systems are consisted of mechanical system instrument, laser power sensor, and user interface. The mechanical system development that uses anti-backlash gear design, was successfully able to enhance the angular resolution angle of incidence laser up to 0.01° . In this system, the laser detector acquisition system and stepper motor controller utilizing Arduino Uno which is easy to program, flexible, and low cost, was used. Furthermore, we employed LabView's user interface as the virtual instrument for facilitating the sample measurement and for transforming the data recording directly into digital form. The test results using gold-deposited half-cylinder prism showed the Total Internal Reflection (TIR) angle of $41,34^\circ \pm 0,01^\circ$ and SPR angle of $44,20^\circ \pm 0,01^\circ$, respectively. The result demonstrated that the developed system managed to reduce the measurement duration and data recording errors caused by human error. In addition, the test results also concluded that the system's measurement is repeatable, accurate, and are also very close to the theory-based simulations results.

Key Word: Surface Plasmon Resonance, Virtual Instrument, Automated, High repeatability, High resolution, SPR instrument.