

Surface Plasmon Resonance Analyzer



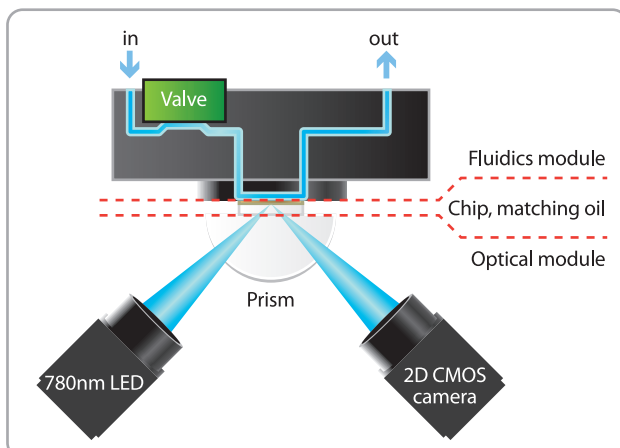
SPR
micro

SPRmicro is miniature microfluidics analyzer in Kretschmann type, and is a commercialized product that can utilize SPR technology, which examines the interaction between molecules in accordance with the changes in refraction index with limited budget.

SPRmicro enables convenient and easy execution of experiments using SPR system that detects interaction and affinity between molecules without labelling, and microfluidic module with different structure can be selected in accordance with experiment. Composition of microfluidics with dual channels enables simultaneous measurement of two different samples. As external pump using sample injection, the amount of injected sample and its injection speed are easily controlled for the experiments.

SPRmicro is designed to separate the optical module and fluidic module. The operation of the system and acquisition of data can be achieved easily through computer connection via USB without external electrical power supply. Experiment can be carried out without the need for separate experimental table due to its compact design and size. Limitations on the experimental environment have been minimized since the SPRmicro can be transferred very easily.

Principles of SPRmicro



Miniature Bio-molecular Interaction Analyzer

- Bio-molecular interaction detection with label-free
- High performance & Low cost
- 2 channel microfluidics
- Real-time monitoring
- Compact design & Handheld

Optical system of SPRmicro

Optical module of SPRmicro is a detector that enables observation of SPR phenomenon. 780nm LED light source and 2D CMOS camera are attached to as detector. Incidental angle range of the light source is 7.4° (74,000RU) and the range of refractive index detection is 1.31~1.38.

Application

• Immunoassay study using SPRmicro

Objective : Performance evaluation as analyzer for bio-molecule interaction through antibody-antigen reaction

Result : Verified linearity of interaction between Protein G-IgG Verified performance of SPRmicro for immune reaction

• Optimization of reactive condition for bio-molecule interaction analysis on surface modified chip using NHS-SAM

Objective : Verification of pH and reaction rate effects (flow rate) for analysis of bio-molecule interaction

Result : IgG displays the optimum reaction at pH 5 and flow rate of 30 ul/min flow rate on NHS modified sensor-chip

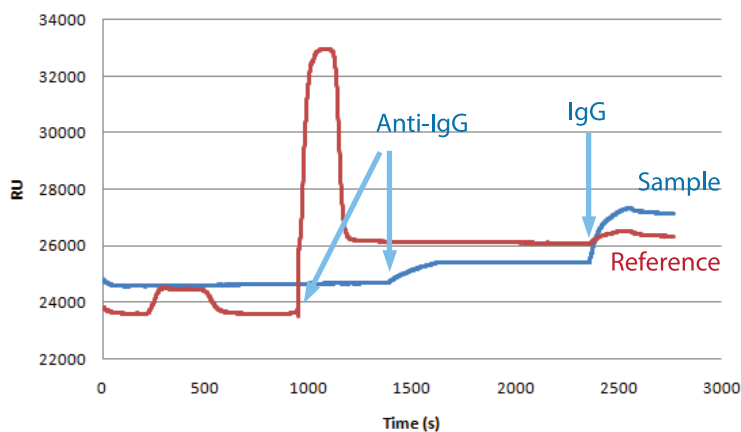
• Bio-molecule interaction analysis

Objective : Performance evaluation for reproducibility and linearity as bio-molecule interaction analyzer through bio-molecule absorption experiment

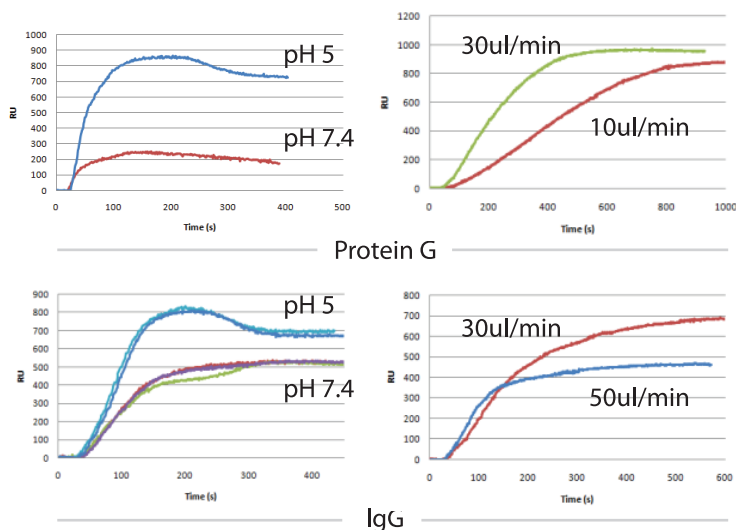
Result : Confirmation of high reproducibility and linearity of SPRmicro.

Microfluidic System of SPRmicro

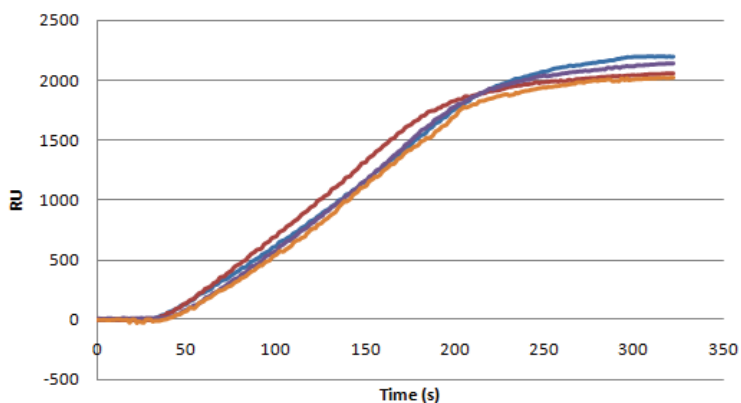
Microfluidic module, sample flow controller, of SPRmicro, enables injection of the sample in real-time by having the inlet section connected to the pump.



Immunoassay



Bio-molecule interaction analysis



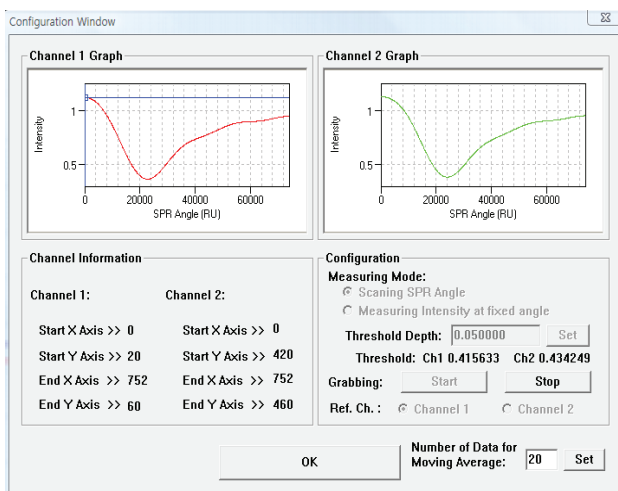
Protein-protein interaction

Software

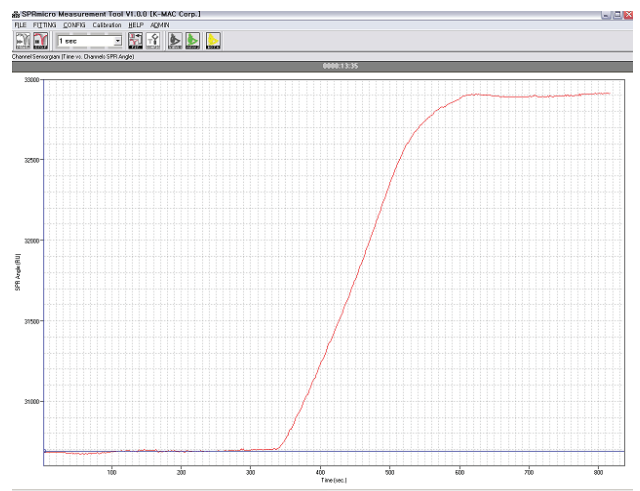
SPRmicro software consists of Measuring tool that executes measurement by detecting changes in sample and Analysis tool necessary in analysis for analysis of diverse range of experiments in various areas.

• Measurement tool

- **Configuration:** Setting and monitoring of experimental conditions
 Raw graph monitoring (Reflectance intensity to Incident angle)
 Measurement mode and reference channel setting
- **Acquisition:** Monitoring of binding kinetics and real time graph
 Quantification of configuration of binding molecule
 Display SPR angle or Reflectance rate against time



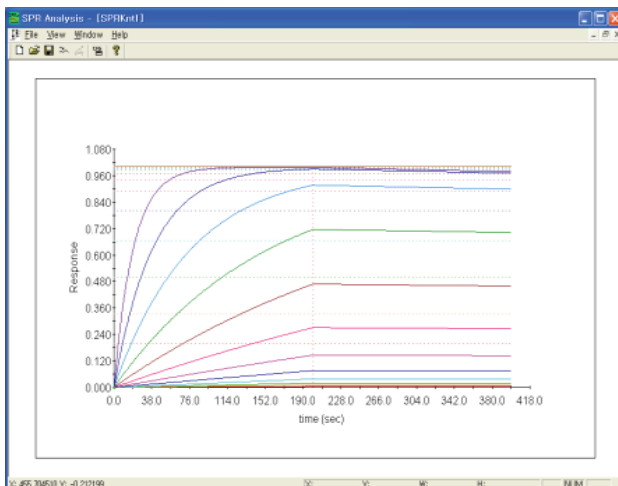
Configuration



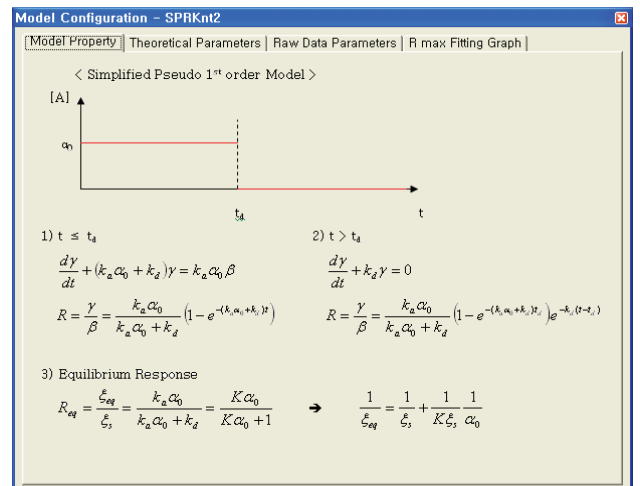
Acquisition of data

• Analysis tool

- Binding kinetics information of molecules confirmation
- Kinetics experimental data edition based on subset for each reaction section
- Diverse range fitting models verification



Kinetics information

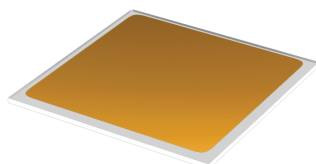


Various fitting models

Specification

| | | |
|-----------------|----------------------------|---------------------------------|
| Sensor System | Measurement method | Angle scan sensor & Sample flow |
| | Sample flow channel | 2 channels |
| | Light source | 780nm LED |
| | Detector | 2D CMOS |
| | Prism material | BK7 |
| | Incident angle range | 61.3° ~ 68.7° (7.4°) |
| | Refractive index range | 1.31 ~ 1.38 |
| | Sample injection volume | 10 μ l |
| | Au coated substrate | 12(W) x 12(D) x 0.3(H) mm |
| Dimensions | 45(W) x 140(L) x 130(H) mm | |
| Data processing | S/W via USB port | |

Sensor chip



Gold coated chip
BK7, 12x12x0.3mm

Pump

Comparable pump spec.

Channel : dual channel

Flow rate : 0.003 ~ 1 ml/min

Tubing size : outer 1/16 inch, inner 0.020-0.040 inch

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