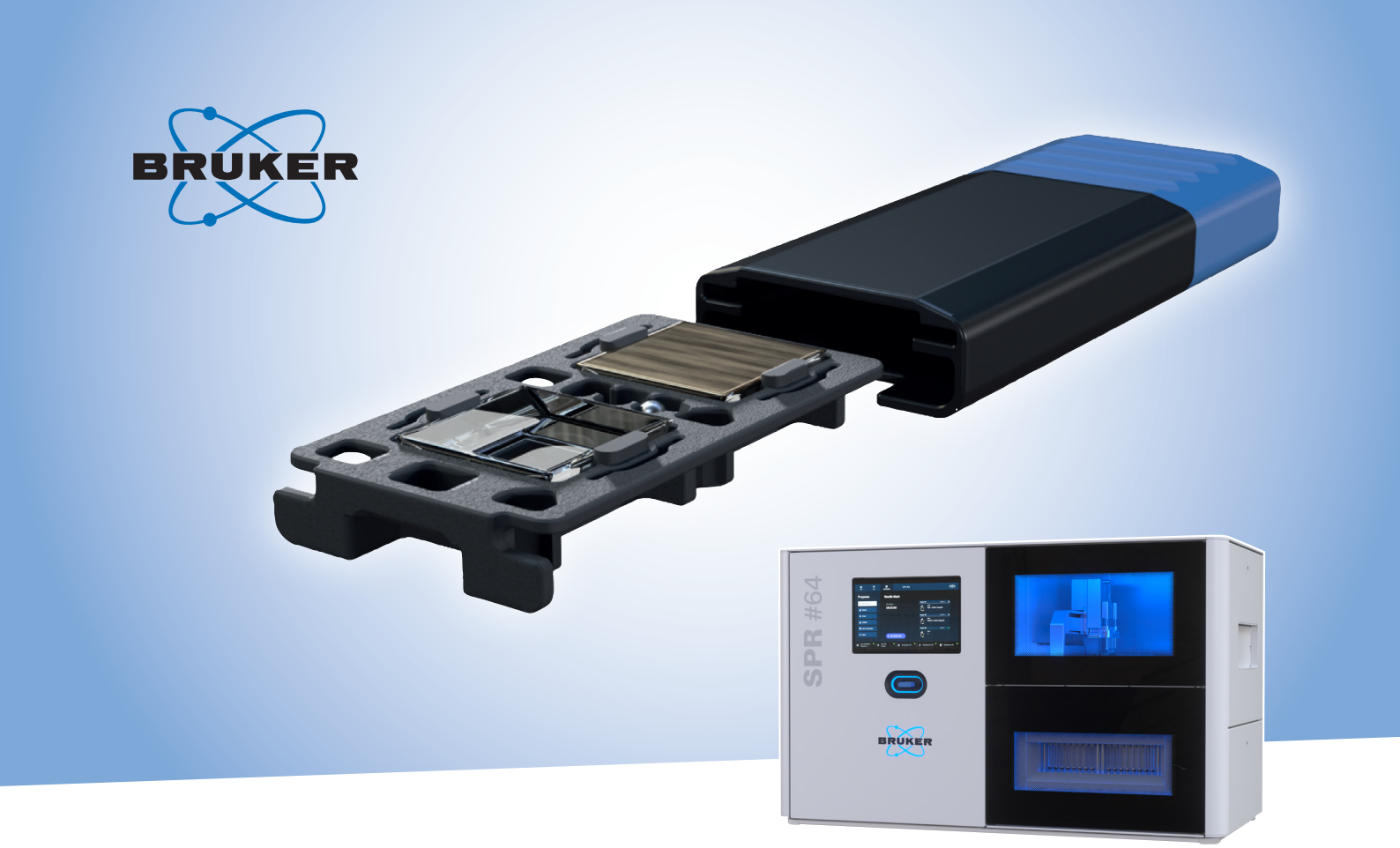

Bruker SPR #64 – Dual prism sensor

There are two main tasks when users interact with a SPR system: measurement of samples and cleaning. The dual prism sensor from Bruker unifies these two duties into a single consumable.

Abstract

Important system maintenance can now be fully integrated into standard workflows, reducing the downtime of the instrument and increasing productivity. The details and features of the dual prism sensor are described in the following technical note.

Keywords:
Bruker SPR #64, high throughput, high sensitivity, application rich

Introduction

Regular maintenance of laboratory equipment is critical in order to retain functionality and extend instrument lifetimes. Currently, cleaning procedures for a microfluidics SPR instrument are separate actions that require manual intervention by the user. Bruker's SPR #64 automizes this task with its unique dual prism sensor. This consumable allows the cleaning of microfluidics and tubing automatically after each experiment without any user intervention. This can add an additional runtime of approximately 30 minutes but dramatically increases convenience.

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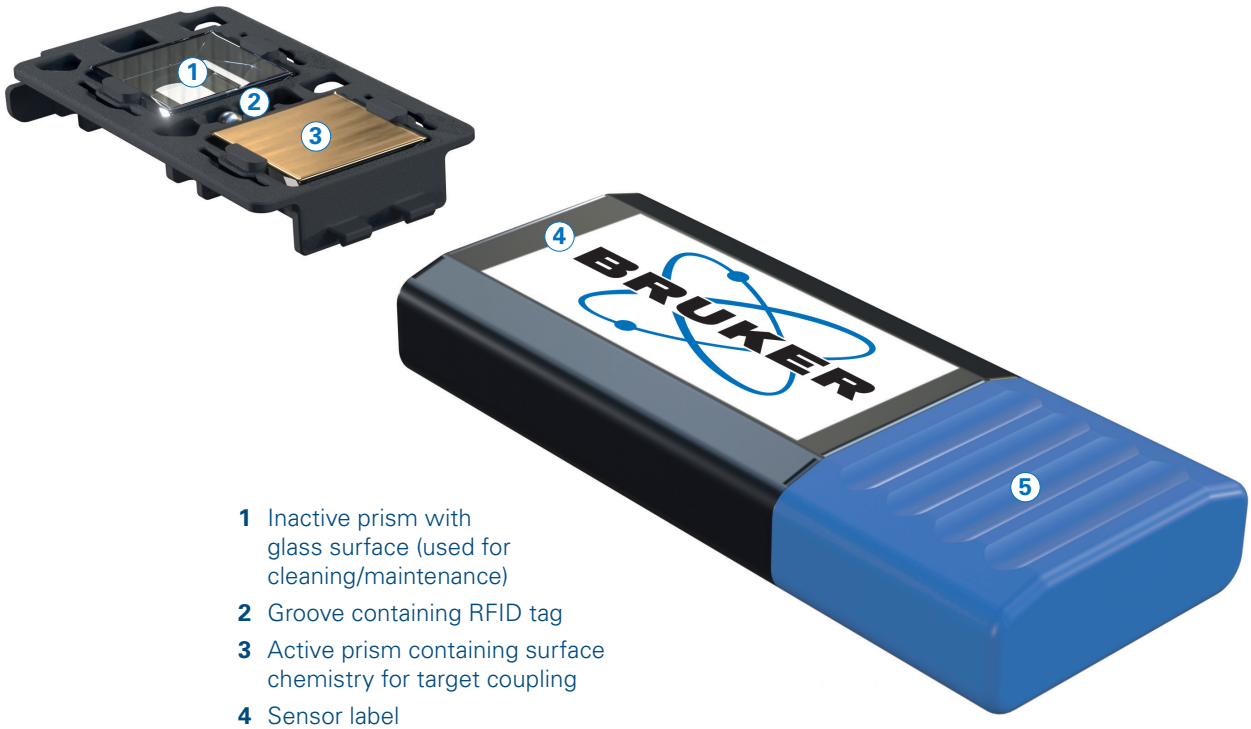
Dual prism sensor chip

Bruker's SPR #64 is the first SPR instrument with a dual prism sensor. One prism contains the sensor surface required for the experiment (active prism) and the second prism is used during maintenance (inactive prism). The user can run maintenance commands automatically after each experiment and the system will be cleaned prior to starting the next experiment.
A schematic illustration can be seen in Figure 1.

An RFID Tag provides consumable-related information, such as date of expiry, information about surface chemistry and batch ID.



1 Inactive prism with glass surface (used for cleaning/maintenance)
2 Groove containing RFID tag
3 Active prism containing surface chemistry for target coupling
4 Sensor label
5 Rubber handle

Figure 1
Schematic illustration of Dual Prism Holder

Workflow comparison

Currently, maintenance and measurement are separate steps, leading to considerable downtime to prepare the system for maintenance runs. A maintenance sensor must be docked and the running buffer must be rinsed out before running a maintenance command such as a desorb. All of these steps require manual intervention by the user. An example of the current workflow is shown in Figure 2.

Utilizing the dual prism sensor requires no further user interference as the SPR #64 will automatically switch from the active prism to the cleaning prism. Additionally, there will be always ddH_2O connected to the system, which is automatically flushed through the microfluidics once the cleaning prism is docked. As the user will prepare and pipette the needed cleaning solutions together with the samples prior the experiment, there is no longer any additional downtime. An example of the new, more convenient workflow is shown in Figure 3.

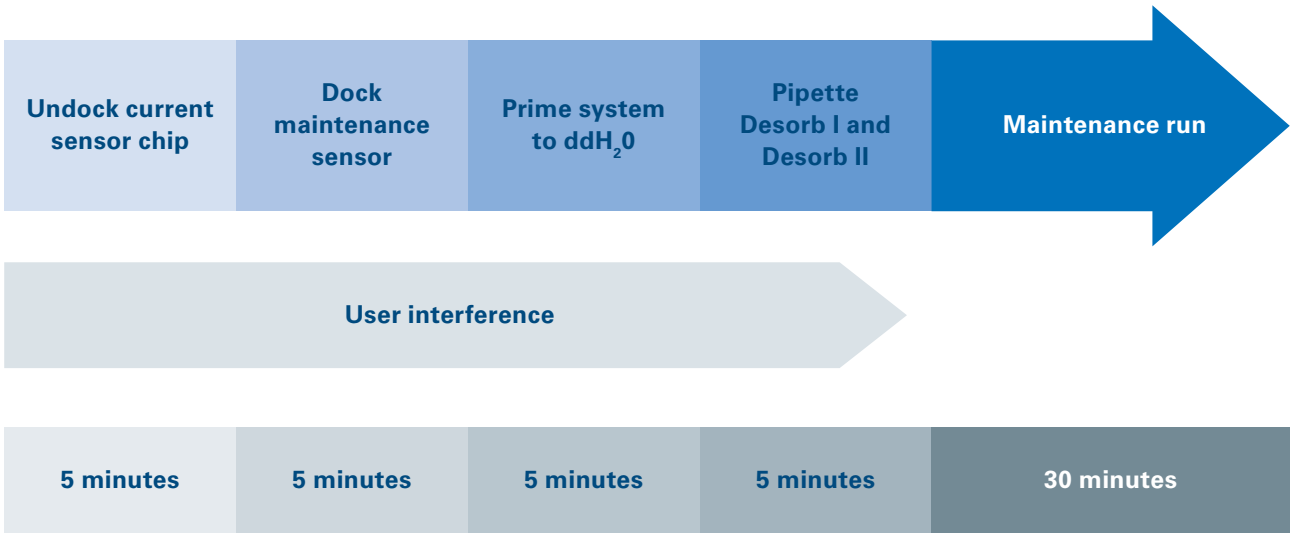
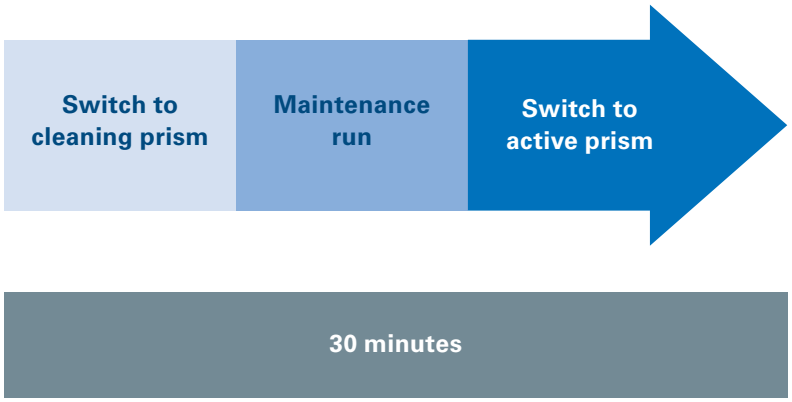


Figure 2
Example of the current workflow of maintenance preparation and need of user intervention.



Note: Pipetting of samples and cleaning solutions prior to the experiment.

Figure 3
Maintenance workflow using dual prism sensor without any need of user intervention.

SPR sensors for covalent and capture coupling of target molecules

Bruker provides a wide range of carefully selected SPR sensors for covalent and capture coupling of target molecules. All sensors deliver maximum analytical performance for your application. Sensors can be used for investigation of biomolecular interactions and binding properties of biological and chemical analytes. Different sensors are available for quantitative analysis and kinetics studies of proteins, nucleotides without affinity tags or lipids, tagged or untagged.

Please contact your local Bruker Daltonics SPR application specialist if you need assistance to select the most suitable sensor for your application.

Sensor	Sensor type	Matrix	Surface Modification	Kinetics	Quanti-fication	Application	Regeneration
SPR # - LCA	Low Capacity Amine Sensor	2D polycarboxylate surface, < 5 nm	Medium charge density; -COOH	✔		General purpose; low target levels	Assay-dependent
SPR # - LNSB	Low Non Specific Binding Sensor	Polycarboxylate hydrogel, 200 nm	Medium polymer density; -COOH	✔	✔	Crude samples; low non-specific interactions	Assay-dependent
SPR # - HCA	High Capacity Amine Sensor	Carboxymethylated Dextran; 500 nm	Medium polymer density; -COOH	✔	✔	General purpose	Assay-dependent
SPR # - PHCA	Polycarboxylate High Capacity Amine Sensor	Polycarboxylate hydrogel, 1500 nm	High polymer density; -COOH	✔	✔	General purpose; high target levels	Assay-dependent
SPR # - HCB	High Capacity Biotin Sensor	Polycarboxylate hydrogel, 200 nm	Medium polymer density; Pre-immobilized Biotin	✔		Capture of e.g., streptavidin, followed by biotinylated molecules	Assay-dependent
SPR # - BTC	Biotin Tag Capture Sensor	Polycarboxylate hydrogel, 200 nm	Medium polymer density; Pre-immobilized Streptavidin	✔		Capture of biotinylated molecules	Assay-dependent
SPR # - HTC	His Tag Capture Sensor	Polycarboxylate hydrogel; 1500 nm	High polymer density; Pre-immobilized tris-NTA	✔	✔	Capture of poly-His tagged proteins	EDTA
SPR # - IgGC	IgG Capture Sensor	Polycarboxylate hydrogel; 30 nm	Medium polymer density; Pre-immobilized Protein A/G	✔	✔	Capture of antibodies and Fc-tagged proteins in specific orientation	Acidic glycine buffers

Table 1
Available Surface Chemistries for the SPR #64

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