

Keysight Technologies Liquid Cell and Sample Plate

[Data Sheet](#)



Overview

The Keysight Technologies, Inc. versatile liquid cell is designed to provide easy setup, a clean imaging environment, and open-cell accessibility. Each cell is made of Kel-F[®], which makes thorough cleaning easy and helps prevent cross-contamination when the cell is utilized for different experiments. The unique cell design enables scientists to perform a wide variety of STM/AFM experiments in liquids and/or under electrochemical and/or temperature control (Figure 2). The liquid cell can be used with aqueous, non-aqueous, or harsh (acid/base) solutions. A flow-through option allows researchers to monitor real-time changes in surface chemistry or biological processes while exchanging solutions. The unique design of Keysight's sample plates (Figure 3) delivers superior sample stability and ease of use. Magnetic suspension provides easy loading and eliminates mechanical drift. The standalone plate permits simple sample mounting and customization of the sample plate. A modular design allows the plate to be used with an unparalleled number of options, such as open liquid cells, flow through cells, salt-bridge cells (for electrochemistry), Petri dishes (live-cell imaging), and glass microscope slides.

Temperature control is available with heating up to 250°C and cooling down to -30°C. All options are available with MAC Mode, Keysight's patented technique for high-resolution AFM imaging in fluid. The integrated electrode connection permits easy hookup for electrical measurements and electrochemistry applications. Additional sample plates may be added for multiple samples and rapid throughput.

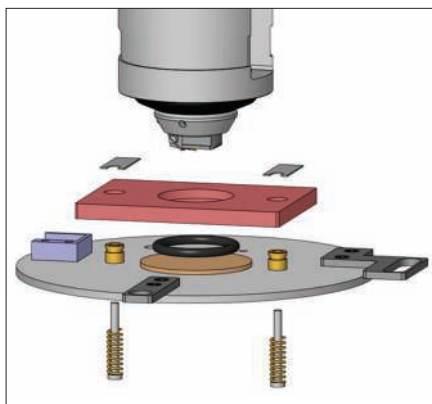


Figure 1. Schematic drawing of liquid cell.

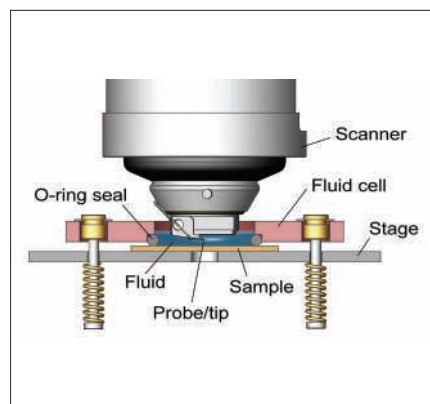


Figure 2. Cross-section view of plate, liquid cell, and scanner's nose cone module.

Features and Benefits

- Modular, symmetric plate design accommodates large sample size
- Magnetically suspended plate mounting minimizes mechanical drift
- Preset electrode connector allows quick, simple setup for electrical measurements and electrochemistry applications
- Superior thermal stability facilitates temperature dependent experiments
- Self-contained cell assembly provides easy sample loading and exchange
- Leak-proof cell design prevents damage to samples and instrumentation
- Flow-through cell capability lets researchers monitor real-time changes while exchanging solutions
- Inert, easy-to-clean cell helps prevent cross-contamination



Figure 3. Sample plates.

Temperature Control

Keysight’s temperature controller uses a patented thermal insulation and compensation design to deliver precise temperature control and excellent stability for high-resolution scanning probe microscopy (SPM). It allows for imaging during temperature changes and is fully compatible with all imaging modes. (See the Keysight Temperature Control data sheet for further information.)

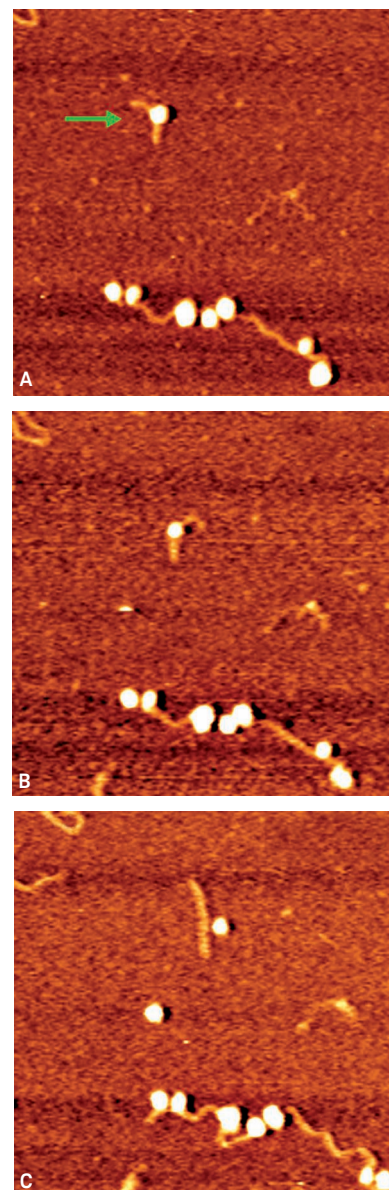


Figure 5. *In-situ* AFM study using flow-thru system. Serial “salt-melting” images of MMTV Chromatin and DNA. Salt content (A) 0M, (B) 0.2M, (C) 0.4M.

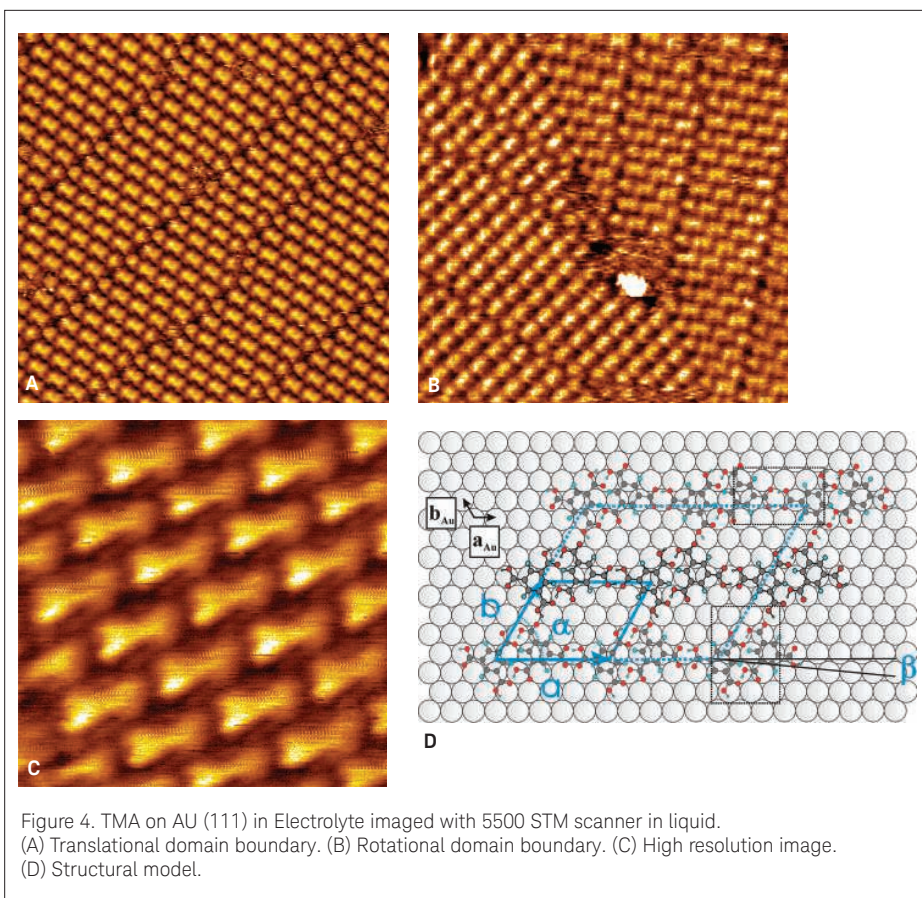


Figure 4. TMA on Au (111) in Electrolyte imaged with 5500 STM scanner in liquid. (A) Translational domain boundary. (B) Rotational domain boundary. (C) High resolution image. (D) Structural model.

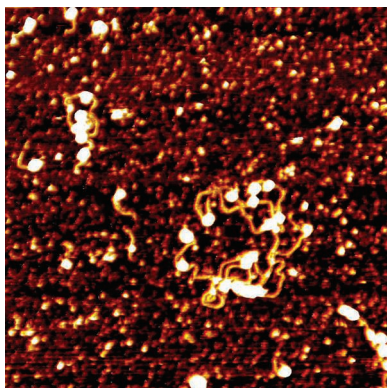


Figure 6. DNA Histon Complex images in water with MAC Mode on a 5500 AFM.

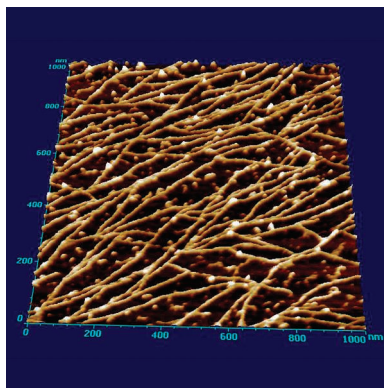


Figure 7. Poly-peptide image on mica in DI water with MAC Mode on a 5500 AFM.

Specifications

Liquid Cell

Standard cell:	33mm x 22mm block with 15mm x 3mm cell volume
Flow-through cell:	Standard cell with 0.9mm tubing holes
Salt-bridge cell:	33mm x 23mm block with 15mm x 2.5mm cell volume
Ag-AgCl reference electrode:	~95mm long with 2mm barrel diameter

Sample Plate

X-Y translation range:	4 mm x 4 mm
Sample size:	< 21mm x 30mm for standard sample
Standard plate size:	74mm x 1.6mm
Hot plate:	Ambient to 250°C
Hot MAC Mode plate:	Room temperature to 100°C
1x Peltier plate:	-5° C to 40°C
1x Peltier MAC Mode plate:	-5° C to 40°C
3x Peltier plate:	Room temperature to -30°C
Petri dish plate:	74mm x 1.6mm with 36mm opening for Petri dish
Glass cover slip stage:	74mm x 1.6mm with 22mm opening for 22mm slip

AFM Instrumentation from Keysight Technologies

Keysight Technologies offers high precision, modular AFM solutions for research, industry, and education. Exceptional worldwide support is provided by experienced application scientists and technical service personnel. Keysight's leading-edge R&D laboratories are dedicated to the timely introduction and optimization of innovative, easy-to-use AFM technologies.

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