

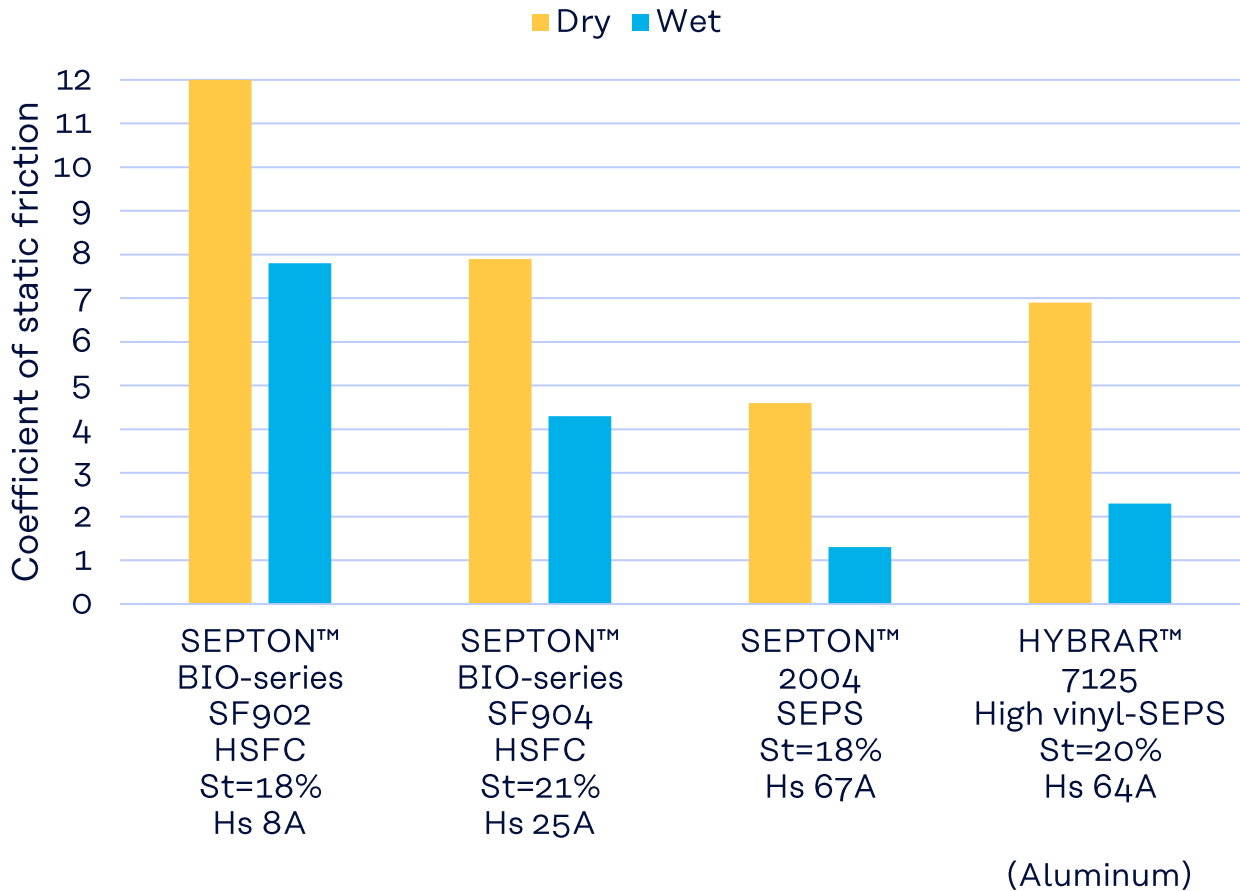
High grip mechanism of SEPTON™ BIO-series

Elastomer R&D department
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kuraray

Grip performance

- SEPTON™ BIO-series show high grip performance compared with general HSBC.
- SEPTON™ BIO-series show high grip performance in wet conditions.





Aluminum



Specimen: Compression molded sheet (0.5mmt)

High grip mechanism of SEPTON™ BIO-series

Key factor

-  Large true contact area or adhesive energy at the interface
-  Squeezing out the water at the interface

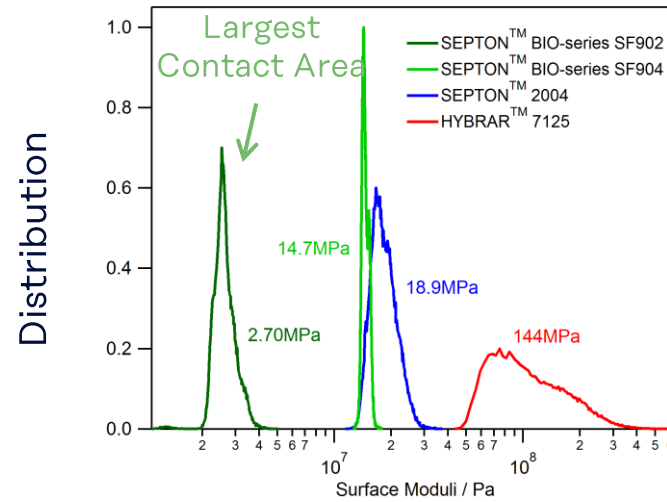
Surface Moduli & Adhesive Energy

SEPTON™ BIO-series have the largest contact area or adhesive energy. We suppose that is a reason of high adhesion in SEPTON™ BIO-series.

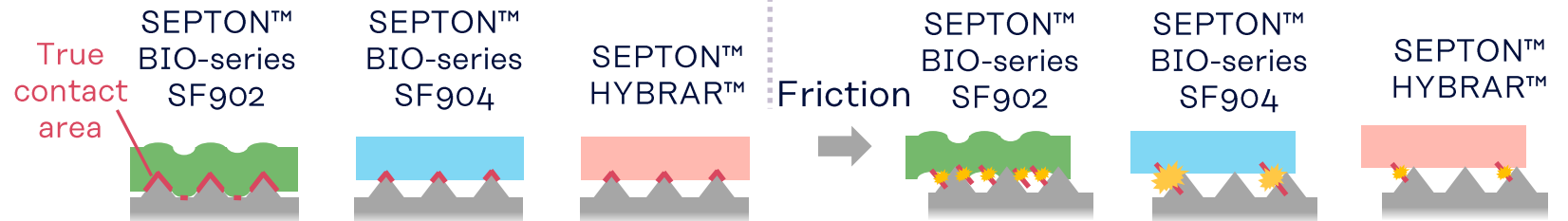
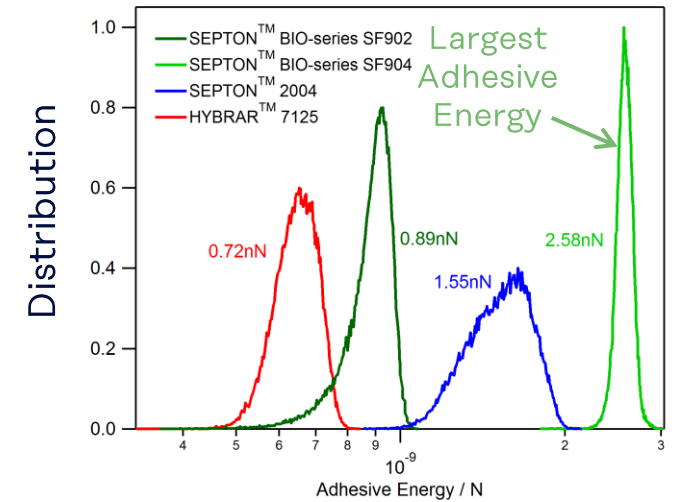


Observed by FV-AFM
(Force Volume-AFM)

Surface Moduli Distribution



Adhesive Energy Distribution

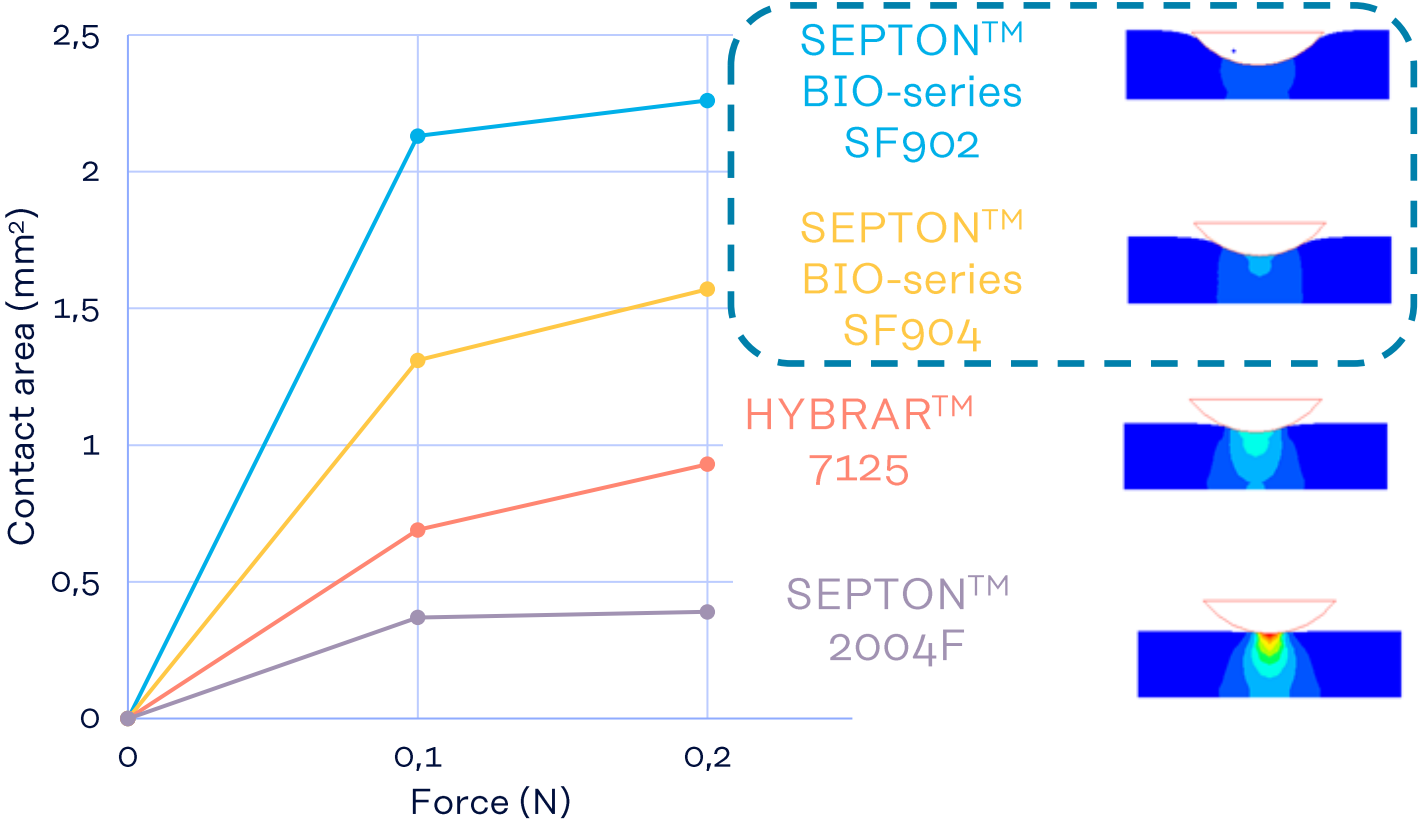
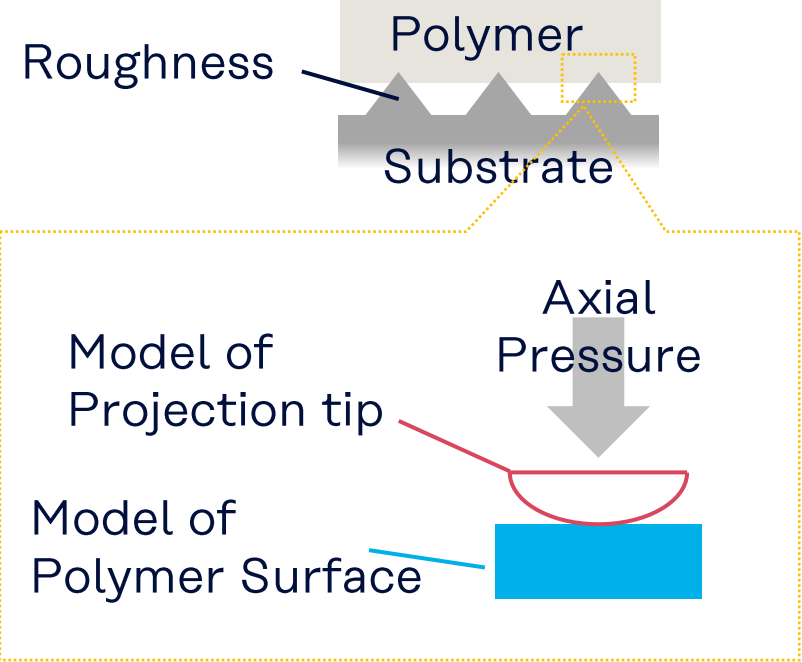


Contact Simulation to Model Roughness

The soft surface of SEPTON™ BIO-series lead to large contact area.

CAE Calculation with *MSC software*

Axial force : 0.2N



(The absolute values that was calculated by this simulation may not be coincide to real value.)

Squeezing out the water



Special observation system on tensile tester (self-made)

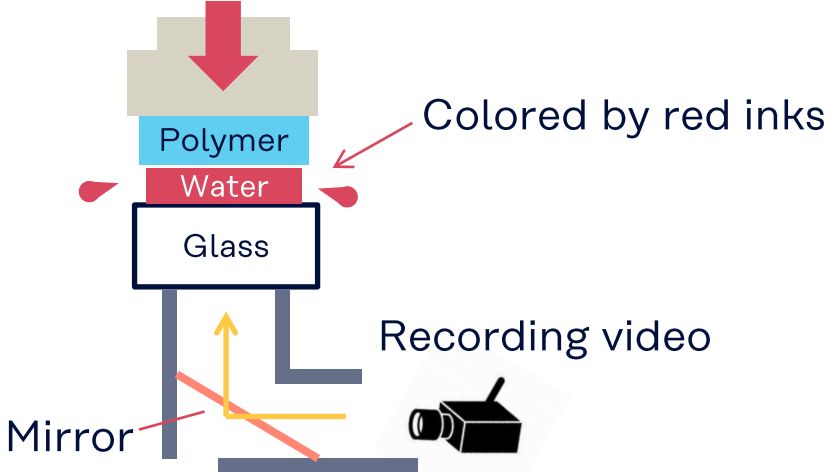
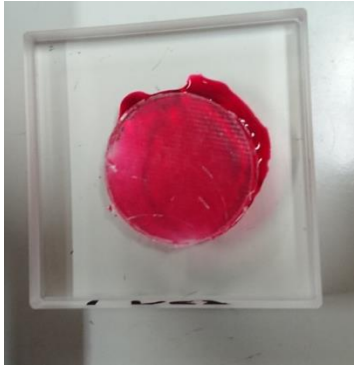


Photo from upside



Significant difference in squeezing out the water

SEPTON™ BIO-series SF902



Red Area Ratio ≈ 0

SEPTON™ BIO-series SF904



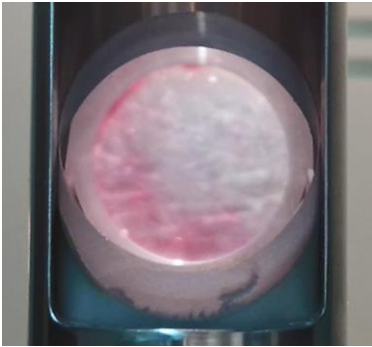
Red Area Ratio ≈ 0.1

SEPTON™ 2004F



Red Area Ratio ≈ 0.5

HYBRAR™ 7125

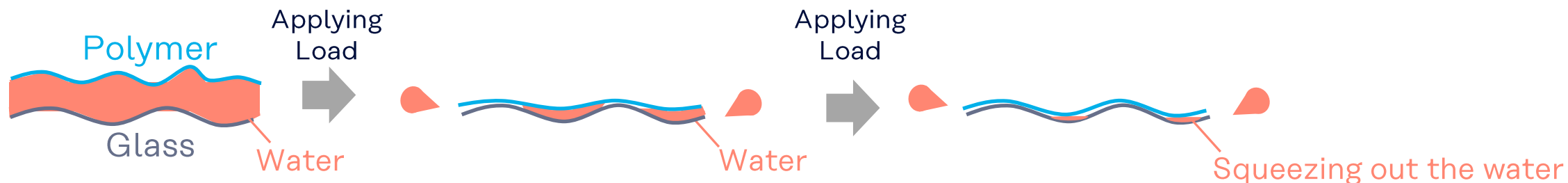


Red Area Ratio ≈ 0.3

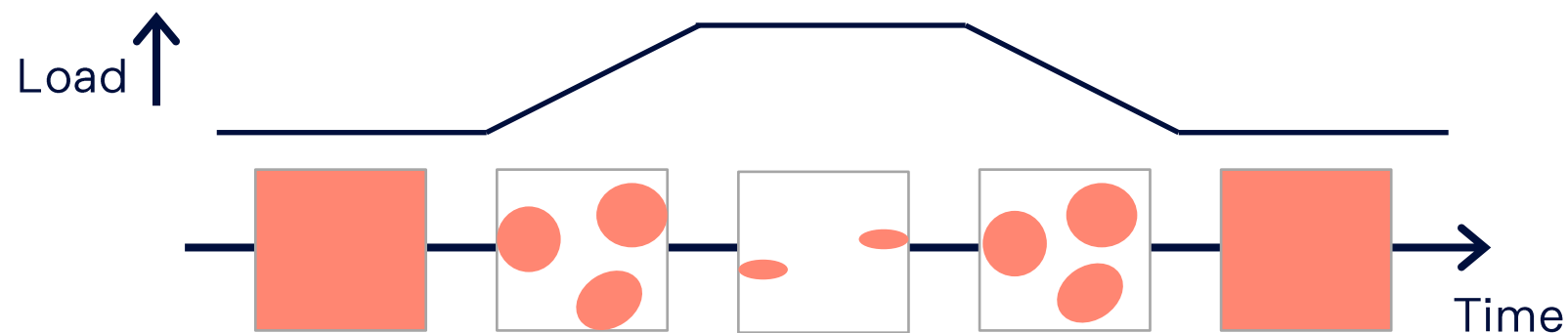
The result of observation

SEPTON™ BIO-series can squeeze out the water at the interface well.
We think that the phenomenon is based on their low surface moduli.

We could observe squeezing out the water at the interface by deformation of polymer film.



We revealed that the residual water at the interface leads to around water during unloading step.



High grip mechanism of SEPTON™ BIO-series

SEPTON™ BIO-series have flexible or adhesive surfaces that can follow the substrate roughness

Dry Grip Mechanism

SEPTON™ BIO-series have large true contact area or large adhesive energy and that leads to large adhesion force.
⇒ **High Grip Performance**

SEPTON™ BIO-series SF902 SEPTON™ BIO-series SF904 SEPTON™ HYBRAR™

True contact area

Friction

Adhesive Energy

Wet Grip Mechanism

SEPTON™ BIO-series can squeeze out water from interface by their deformation.
⇒ **High Grip Performance**

SEPTON™ BIO-series

True Contact area

SEPTON™ HYBRAR™

Water inhibits contact

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