

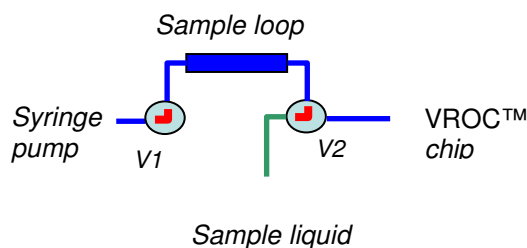
Application Note: Viscosity Measurement of Photoresist

Application

Measuring the viscosity of a photoresist using a VROC™

Test Conditions

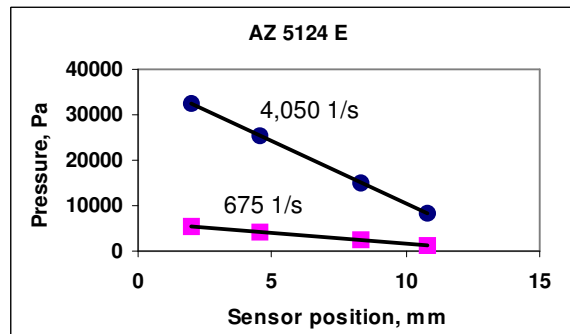
- Test sample: AZ 5124 E photoresist
- Kinematic viscosity: 24 cSt (No temperature reference)
- Specific gravity: 1.038
- VROC™: B type
- Full scale pressure of the chip: 35k Pa
- Flow channel depth: 98.7 μm
- Sample loop volume: 1.2 ml
- Sample loading: semi-automatic
- Temperature: ambient condition, 22.5 °C



The system response upon pumping the liquid was fast—it reached a steady state in less than 10 seconds, as illustrated in the previous graph. The following sections discuss the test results.

Pressure Drop

The pressure profiles averaged at a steady state showed that the pressure drop (the slope of the curve) was constant at each shear rate. This confirmed that the flow was fully developed, as shown below.

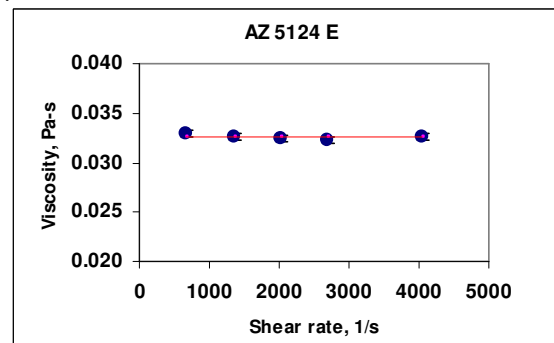


Measurement Procedure

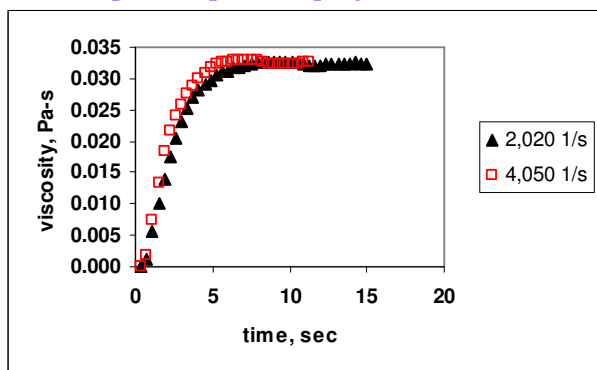
- 1) The photoresist was collected from a microfabrication laboratory. The history of the sample was unknown.
- 2) The sample was loaded into the sample loop semi-automatically, using a combination of valves and pump control. This method of sample loading minimized the evaporation of the volatiles of the photoresist—this method is strongly recommended, as photoresist material tends to have a strong odor.
- 3) Before infusing the sample, the valve (V2) was switched to open a channel to the chip.
- 4) The measurements were recorded and graphed.
- 5) The flow path was cleaned with Acetone.

Viscosity at Different Shear Rates

The average value of the measured dynamic viscosity was 32.5 cP at 22.5 °C. The viscosity was the same regardless of shear rate, as shown below—the photoresist behaved as a Newtonian.



Time Response Upon Pumping



All measurements data were stored and graphed using the RheoSense application software.

