

# Sessile drop method

<b>Author</b>	T. Koroku
<b>Device</b>	Contact Angle Meters
<b>Point</b>	The relationship between wettability and condition of the solid's surface
<b>Keywords</b>	Sessile drop method, hydrophilicity, wettability, surface contamination



## Introduction

Generally, the smooth surface of a well-cleaned unused glass slide has good wettability with water. The water droplet spreads over the surface after contact with the glass slide, resulting in a low contact angle. Contaminations that adhere to the solid's surface negatively influence the adhesive forces between the glass and water, changing its wetting properties.

Contact angle measurements of water are an easy way to determine the condition of a solid's surface.

## Measurements and Results

We prepared unused glass slides of an unopened package and exposed them to air in a non-clean room for 4 different periods, namely, 0, 24, 48, and 72 hours, respectively.

Using the sessile drop method, the relationship between the contact angle and the exposure time was investigated by the Kyowa contact angle meter DMo-702. We used distilled water droplets with a volume of 1  $\mu$ L, performed five measurements on each sample, and used the average contact angle to compare the influence on the wettability over time.

The contact angle of water with the glass surface tends to be higher the longer their exposure to air (*Table 1, Fig. 1*). Examples of the captured images and contact analysis after each air exposure time show the different spreading behavior of the droplets (*Fig. 2 to Fig. 5*).

Exposure time to air [hours]	Average contact angle of distilled water [°]
0	$2.9 \pm 0.4$
24	$9.4 \pm 0.9$
48	$16.6 \pm 1.9$
72	$23.0 \pm 0.8$

**Table 1** - The average contact angle on glass surfaces with different exposure times

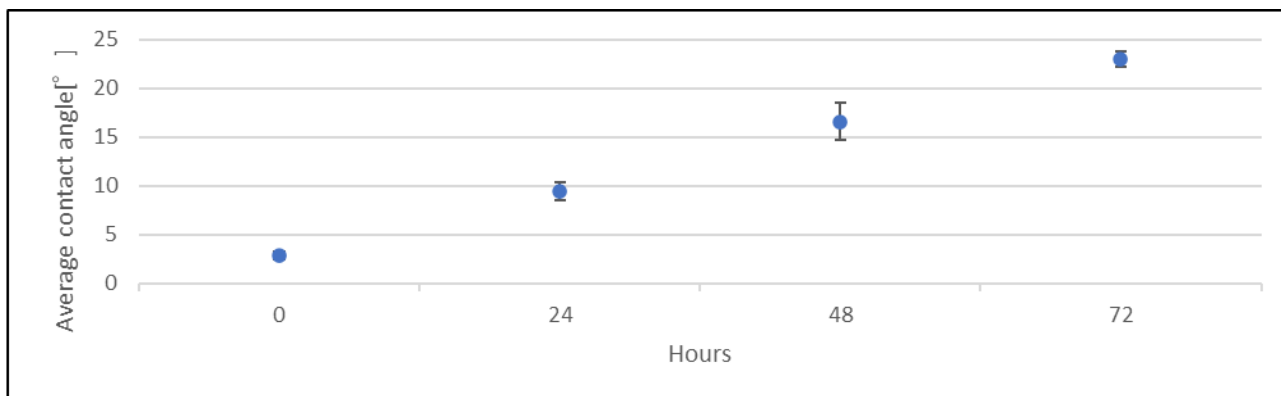


Fig. 1 - The average contact angles and error bars on the glass surfaces with different exposure times

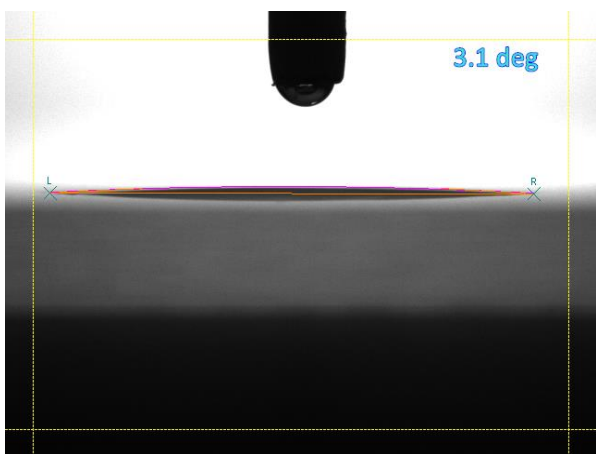


Fig. 2 - Example image of 0 hours of air exposure

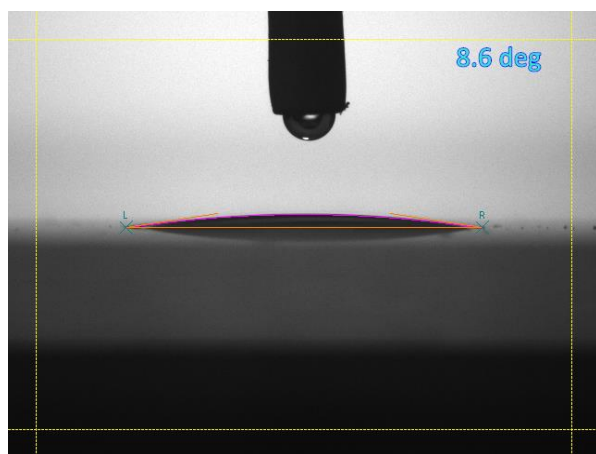


Fig. 3 - Example image of 24 hours of air exposure

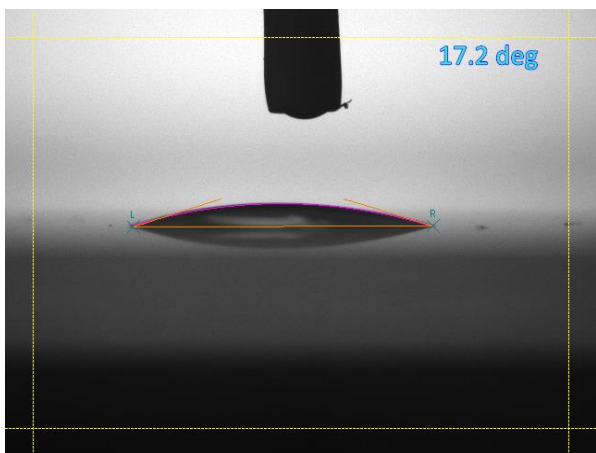


Fig. 4 - Example image of 48 hours of air exposure

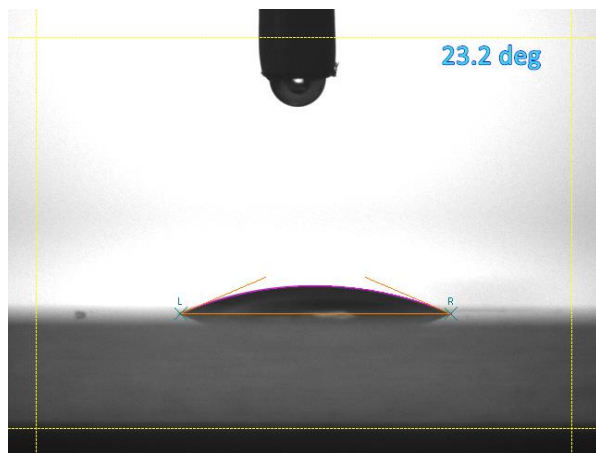


Fig. 5 - Example image of 72 hours of air exposure

**Overall**

We found that the glass plates exposed to air have higher contact angles than unused ones. It indicates that material surfaces are generally susceptible to atmospheric contamination, which can significantly impact solid surfaces' wettability. Even with no apparent visual evidence of a change on the surface, a single drop of water can capture changes in surface conditions. The contact angle measurement is the perfect method to check the solid surface condition as it is fast, sensitive, reliable, reproducible, and easily comparable.

Our high-performance optical contact angle meter has various models with sophisticated designs for all customer's needs. Optional accessories, such as a computer-controlled dispenser, temperature control devices, and an external tilting stage, allow the device to meet special needs.