Dataset Description

Dataset supporting journal publication "Towards accurate evaluation of pressure-induced Cassie-to-Wenzel wetting transition on superhydrophobic surfaces"

Samo Jereb, Matic Može, Matevž Zupančič, Iztok Golobič*

University of Ljubljana, Faculty of Mechanical Engineering, Aškerčeva c. 6, SI-1000 Ljubljana, Slovenia

Corresponding author:

** E-mail: matevz.zupancic@fs.uni-lj.si (Matevž Zupančič)*

This dataset is organized within 8 folders.

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Table of Contents

Folder 1: Surface C-L-S140

Description: This folder (in a zipped file) contains a table with the time evolution of the sensor-measured force, along with the corresponding side-view images of the droplet. The data were acquired on surface C-L-S140 (24 μm high 110 μm wide circular micropillars with a 140 μm spacing between adjacent pillars).

The table is stored as a comma-separated values (CSV) file where the first column represents the data acquisition time, the second column contains the sensor-measured values, and the third column contains the name of image file that corresponds to the given timestamp. The *.png* image file names provided as *XXX.XXs.png* denote the timestamp at which the frames were captured. The *.png* image files have color depth of 8 bit and can be opened with standard image viewers.

Type of data: Raw data.

Data format: Data in *.csv* and *.png* format.

How data were acquired: The surface was placed on a stain gauge loadcell (Strain Measurement Devices, S100 Load Cell) connected to a data acquisition system (Dewesoft, MonoDAQ-E-STG). A 2 μL water droplet attached to a glass sheet was gradually lowered onto the surface using a linear stage with a piezoelectric inertia drive (ThorLabs, PD1/M) at the rate of 4 μm/s. The force value was acquired at the rate of 100 Hz. Prior to the measurement, the force acquisition system was calibrated using a set of calibration weights. Side-view images of the droplet were captured using an optical camera (ZWO, ASI174MM) with a macro lens (Laowa, 100 mm F2.8 CA-Dreamer) at 4 fps and a pixel-to-pixel distance of ~ 4 μm px^{-1}. The measurement was completed once a sharp drop of force was detected.

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The data were acquired in the period between Aug 28 – Sept 24, 2024.

Folder 2: Surface C-L-S65

Description: This folder (in a zipped file) contains a table with the time evolution of the sensor-measured force, along with the corresponding side-view images of the droplet. The data were acquired on surface C-L-S65 (24 μm high 110 μm wide circular micropillars with a 65 μm spacing between adjacent pillars).

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Description: This folder (in a zipped file) contains a table with the time evolution of the sensor-measured force, along with the corresponding side-view images of the droplet. The data were acquired on surface R-L-S140 (24 μm high 60 μm wide rectangular micropillars with a 140 μm spacing between adjacent pillars).

The table is stored as a comma-separated values (CSV) file where the first column represents the data acquisition time, the second column contains the sensor-measured values, and the third column contains the name of image file that corresponds to the given timestamp. The *.png* image file names provided as *XXX.XXs.png* denote the timestamp at which the frames were captured. The *.png* image files have color depth of 8 bit and can be opened with standard image viewers.

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Description: This folder (in a zipped file) contains a table with the time evolution of the sensor-measured force, along with the corresponding side-view images of the droplet. The data were acquired on surface C-H-S140 (48 μm high 110 μm wide circular micropillars with a 140 μm spacing between adjacent pillars).

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