

# From intentionally used plastic films to soil microplastic contamination

Support Information

Ana Carolina Cugler Moreira, MSc

EGU 23, Vienna, Austria

April, 28<sup>th</sup> 2023

01

METHODOLOGY

# Description

## Treatments

### UV treatment

- Q-SUN Xe-1-SE test chamber;
- Xenon arc lamp 1800 W (300-400 nm);
- Daylight-Q filter (noon summer sunlight);
- 50°C;
- 24h of UV light;
- 75 W/m<sup>2</sup>.

### Abrasion treatment

- 20 g of loamy sand soil (Lufa Speyer);
- Roller mixer with 4 rpm for 61 days;
- Samples washed on ultrasonic bath with distilled water for 5 minutes before analyses.

# Description

## Analyses

### FTIR-ATR

- Bruker Equinox 55;
- Platinum diamond crystal ATR;
- 32 scans, 4000-400  $\text{cm}^{-1}$ , 4  $\text{cm}^{-1}$ .

### 3D Laser Scanning Confocal Microscope (LSM)

- Keyence VK-X1000 Series;
- 404 nm laser;
- Coaxial light.

### Optical Contact Angle (OCA)

- Dataphysics OCA35;
- 2  $\mu\text{l}$  distilled water.

02

RESULTS

# NON-AGED

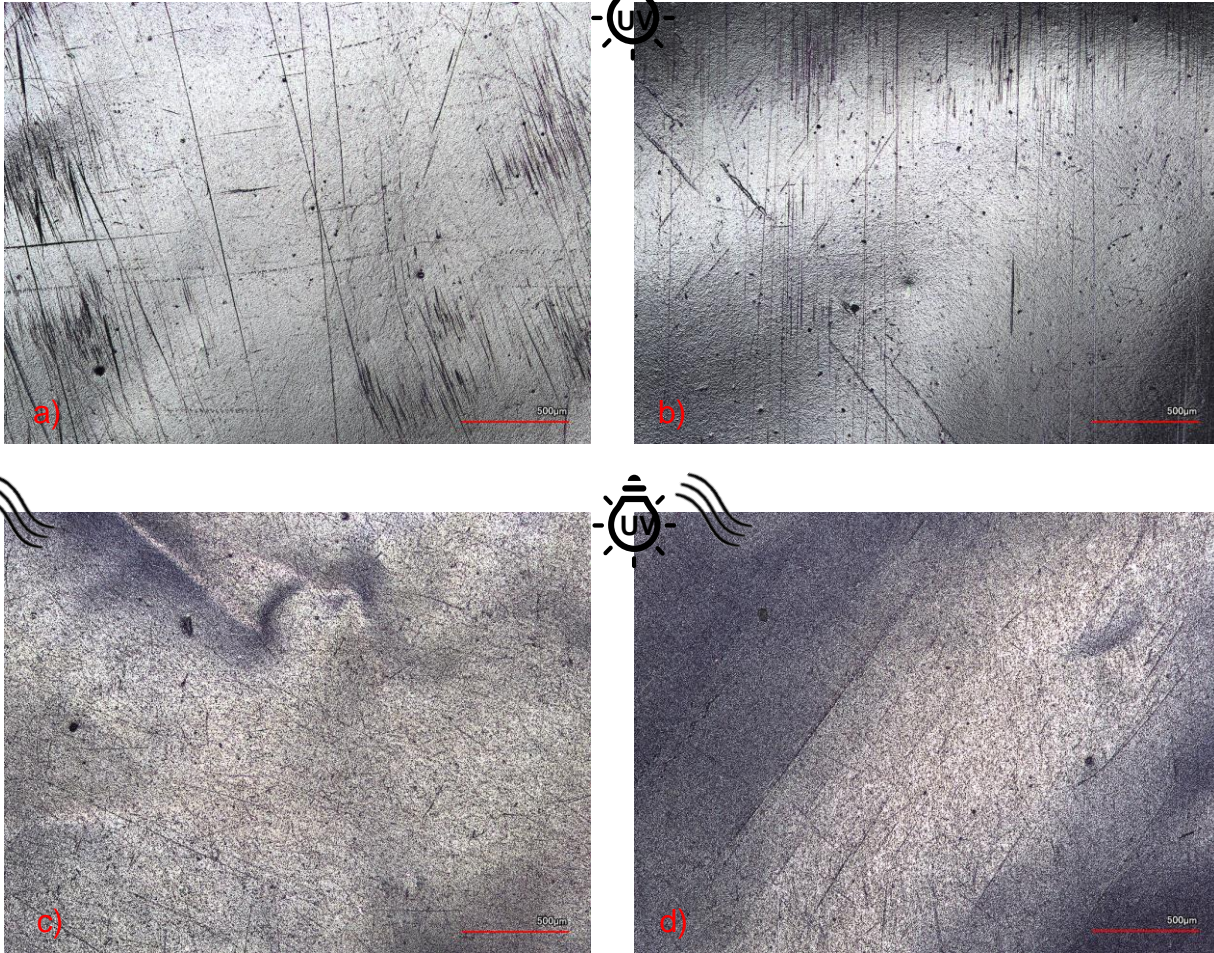


Figure 1: Laser scanning microscope images, 500 µm. a) and b) Black mulch 1 (20 µm), 0 and 80 days UV degraded, respectively; c) and d) Black mulch 1, 0 and 80 days UV degraded combined with abrasion, respectively.

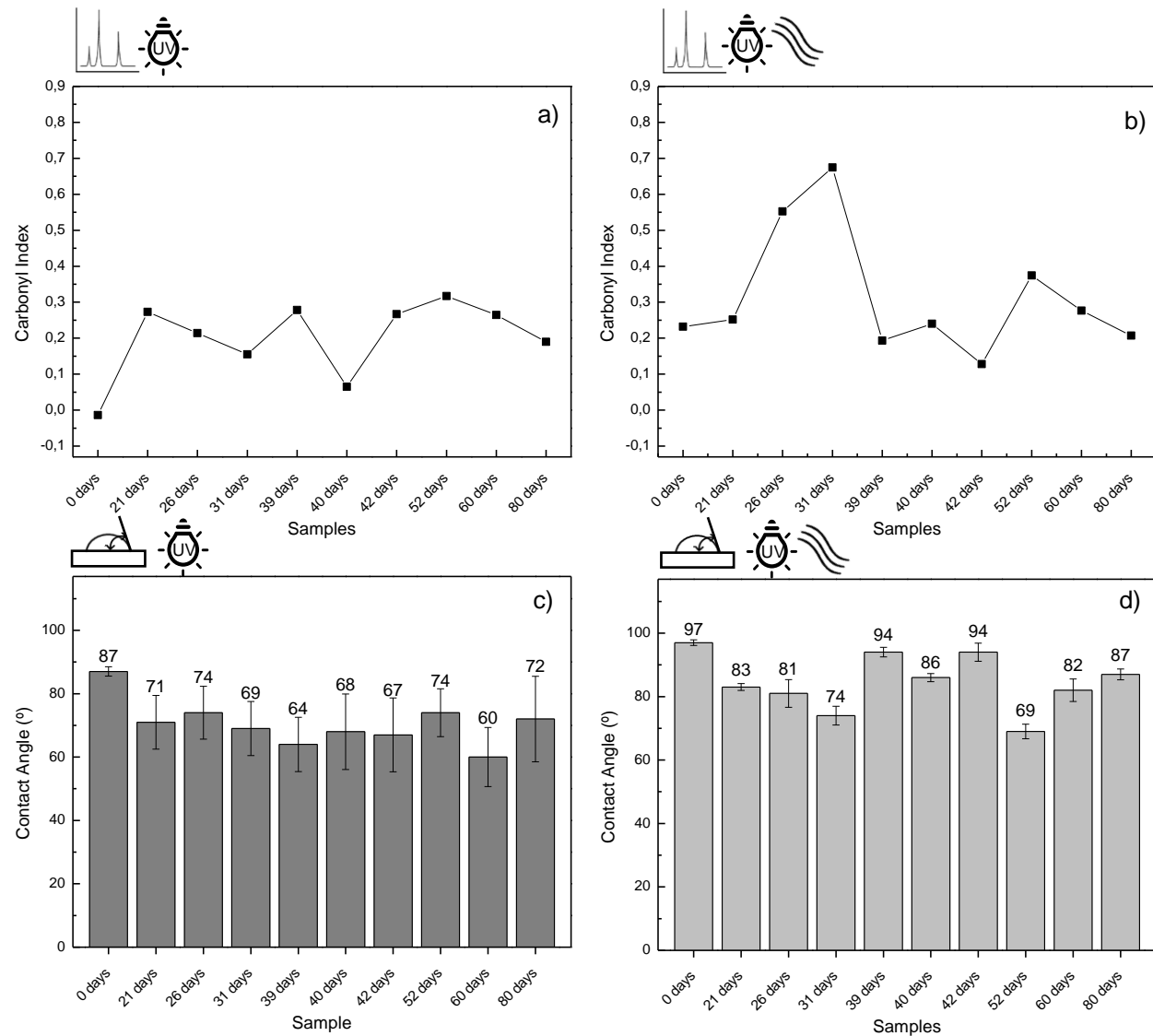


Figure 2: a) Carbonyl index of UV degraded black mulch 1 (20 µm); b) Carbonyl index of UV degraded combined with abrasion black mulch 1; c) Contact angle of UV degraded black mulch 1; d) Contact angle of UV degraded combined with abrasion black mulch 1.

NON-AGED

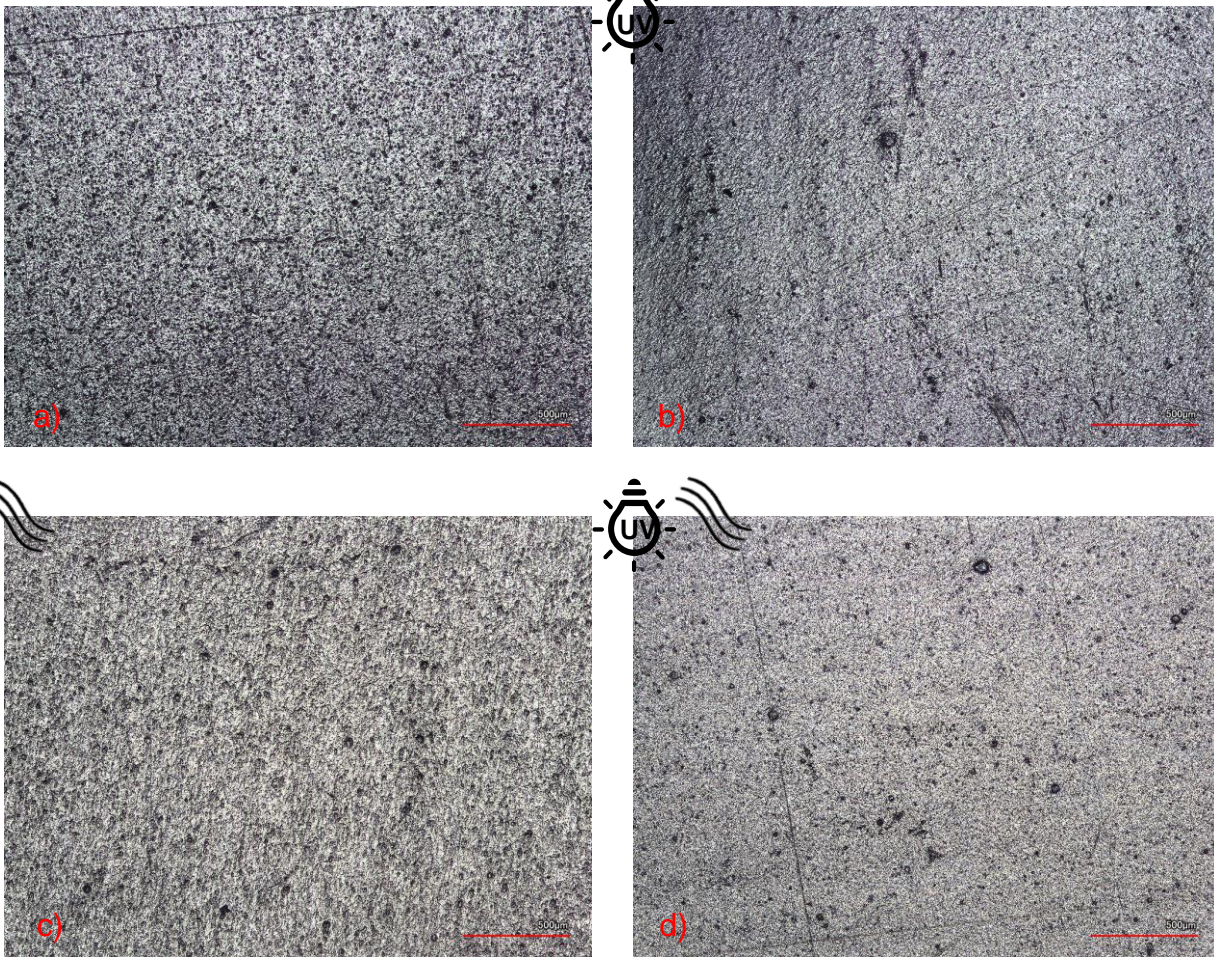


Figure 3: Laser scanning microscope images, 500 μm. a) and b) Transparent 1 (180 μm), 0 and 80 days UV degraded, respectively; c) and d) Transparent 1, 0 and 80 days UV degraded combined with abrasion, respectively.

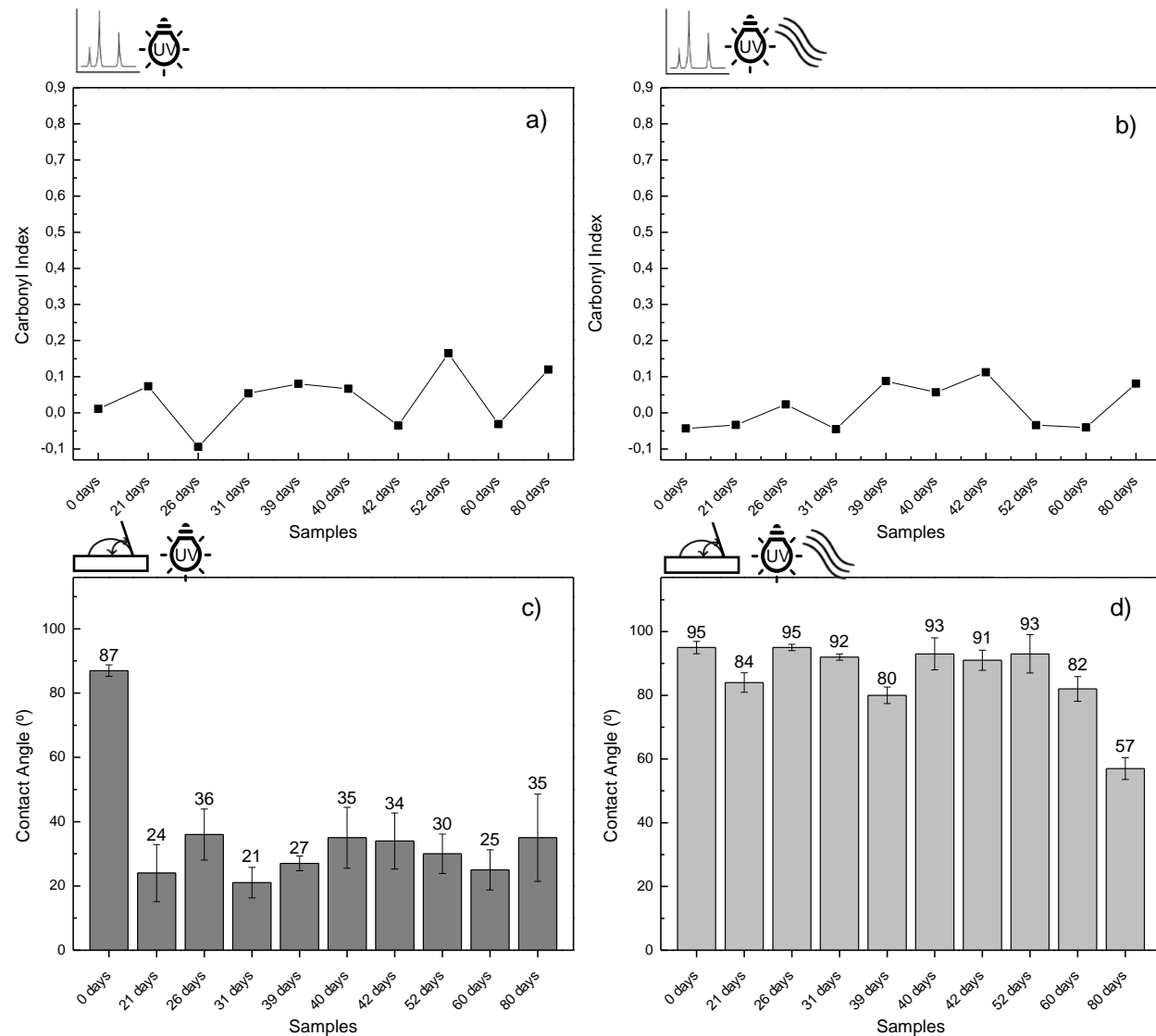


Figure 4: a) Carbonyl index of UV degraded transparent 1; b) Carbonyl index of UV degraded combined with abrasion transparent 1; c) Contact angle of UV degraded transparent 1; d) Contact angle of UV degraded combined with abrasion transparent 1.



# NON-AGED

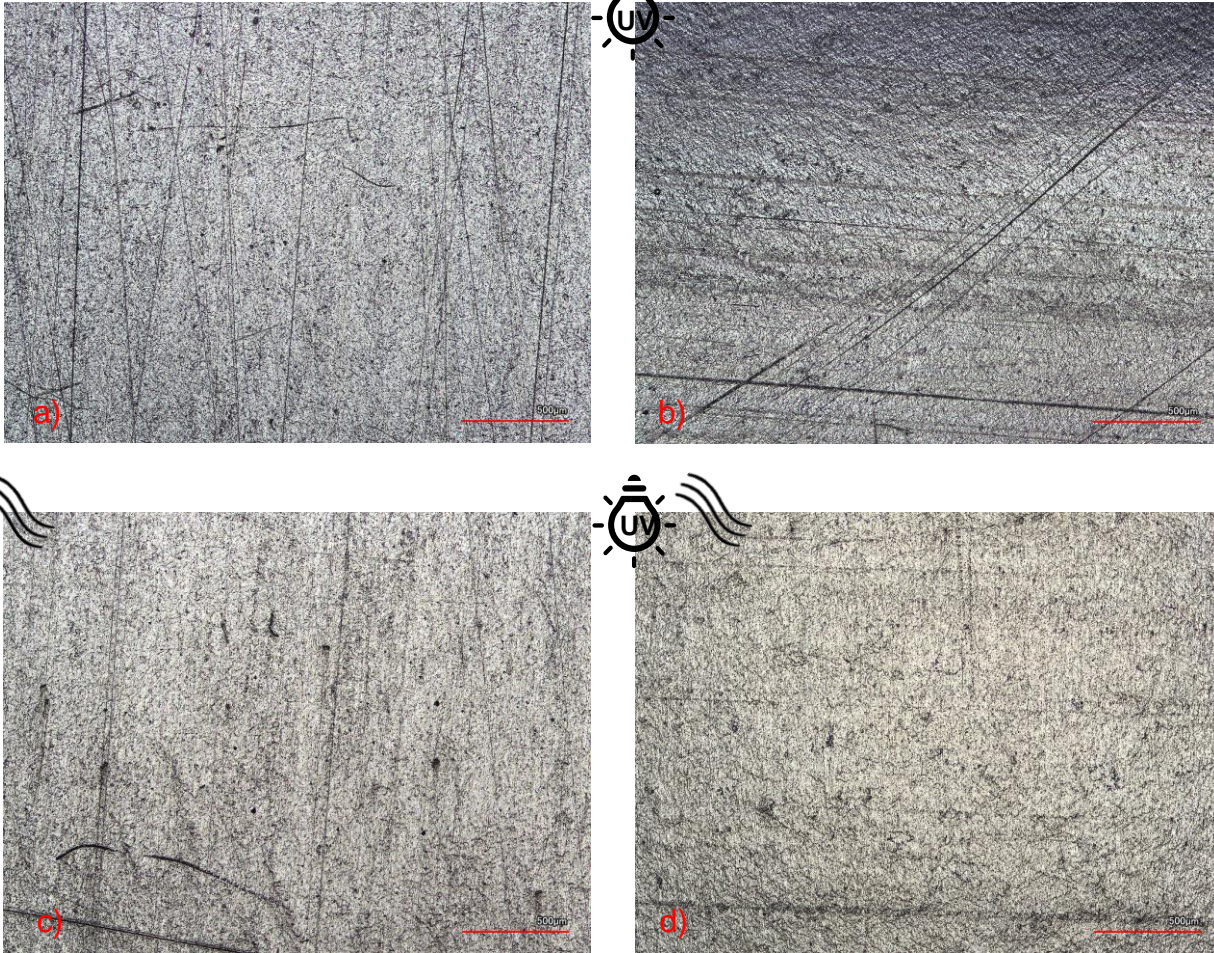


Figure 5: Laser scanning microscope images, 500 µm. a) and b) Transparent 2 (180 µm), 0 and 80 days UV degraded, respectively; c) and d) Transparent 2, 0 and 80 days UV degraded combined with abrasion, respectively.

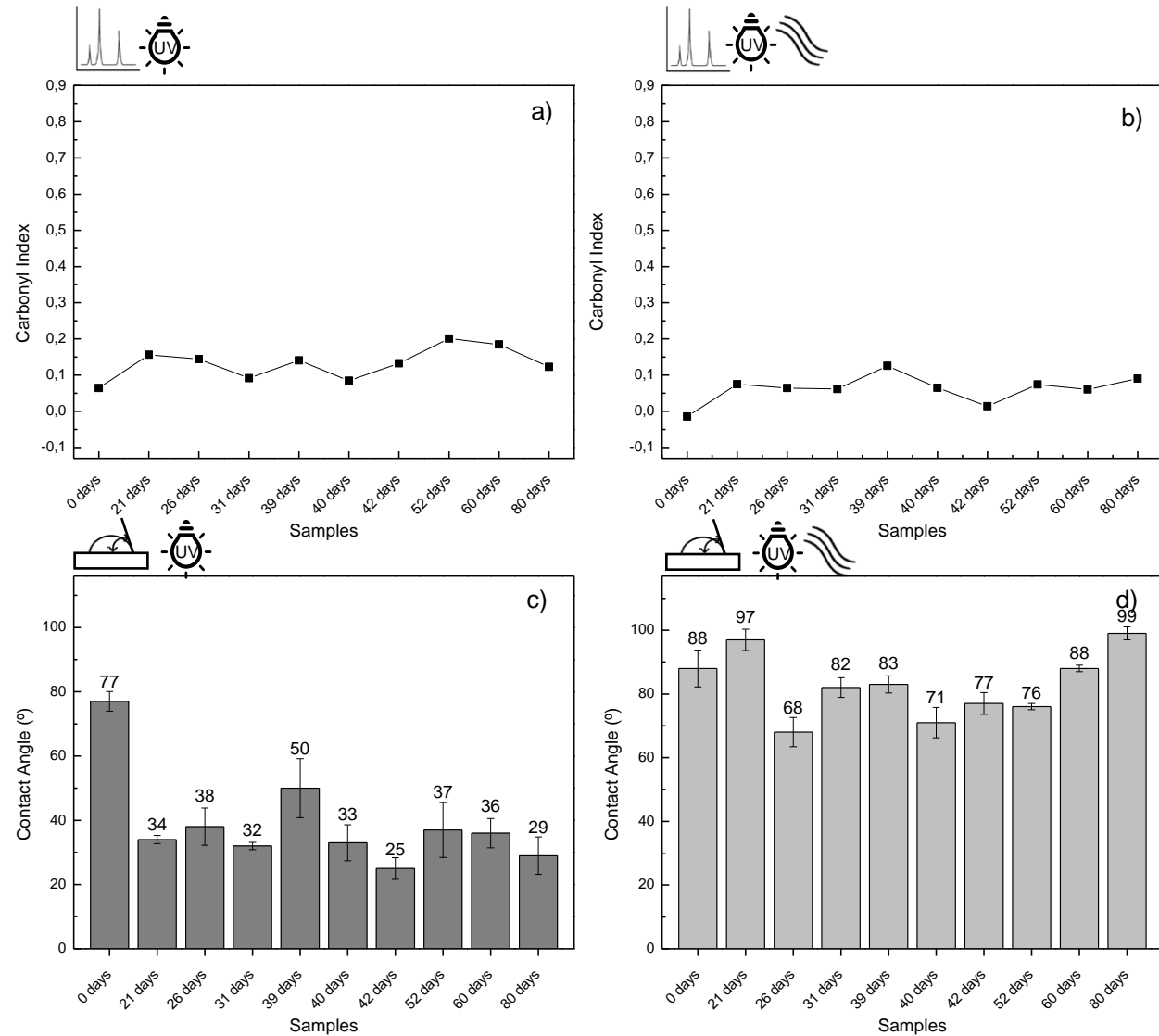


Figure 6: a) Carbonyl index of UV degraded transparent 2; b) Carbonyl index of UV degraded combined with abrasion transparent 2; c) Contact angle of UV degraded transparent 2; d) Contact angle of UV degraded combined with abrasion transparent 2.





# NON-AGED

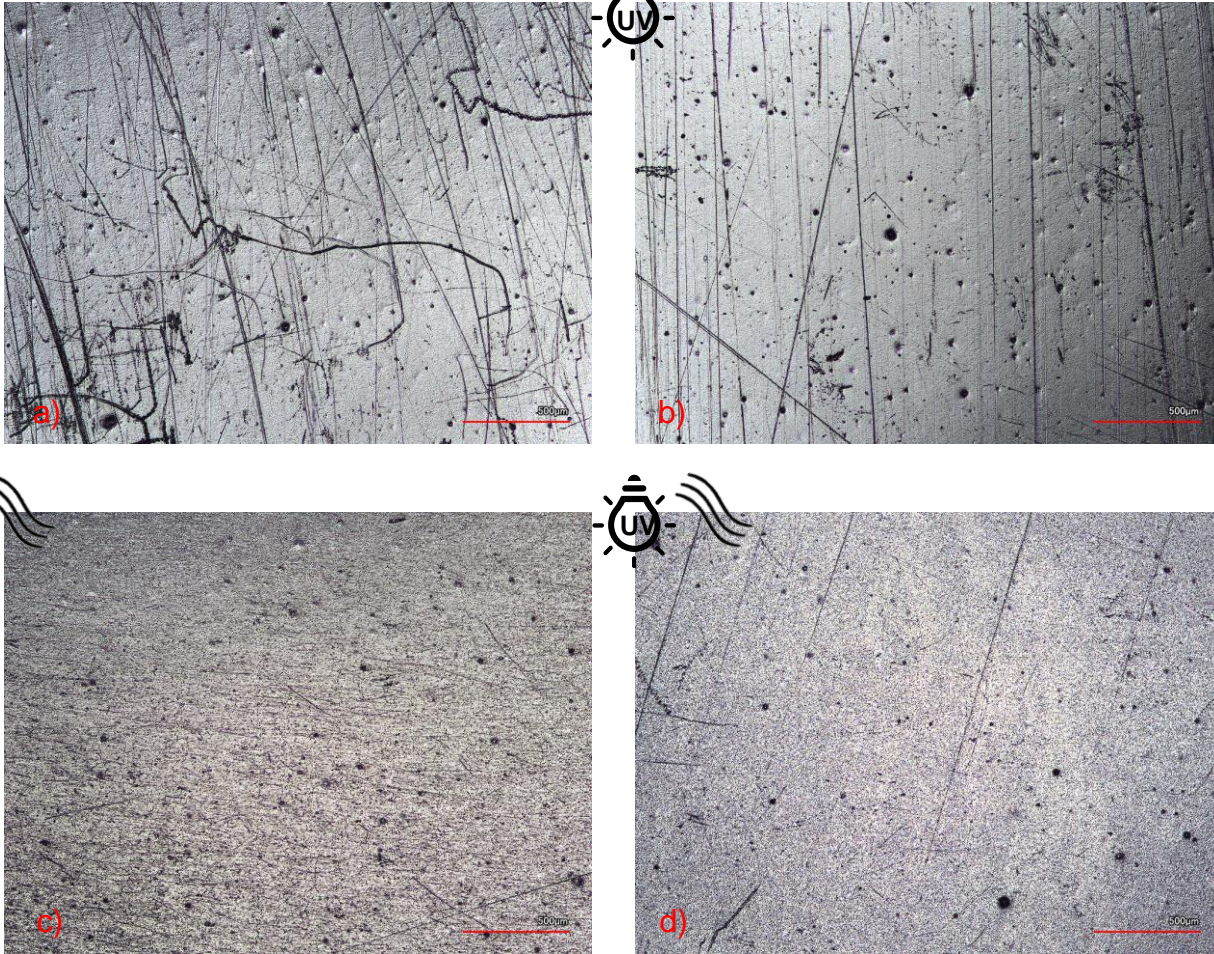


Figure 7: Laser scanning microscope images, 500 µm. a) and b) Black and white 1, black part (100 µm), 0 and 80 days UV degraded, respectively; c) and d) Black and white 1, black part, 0 and 80 days UV degraded combined with abrasion, respectively.

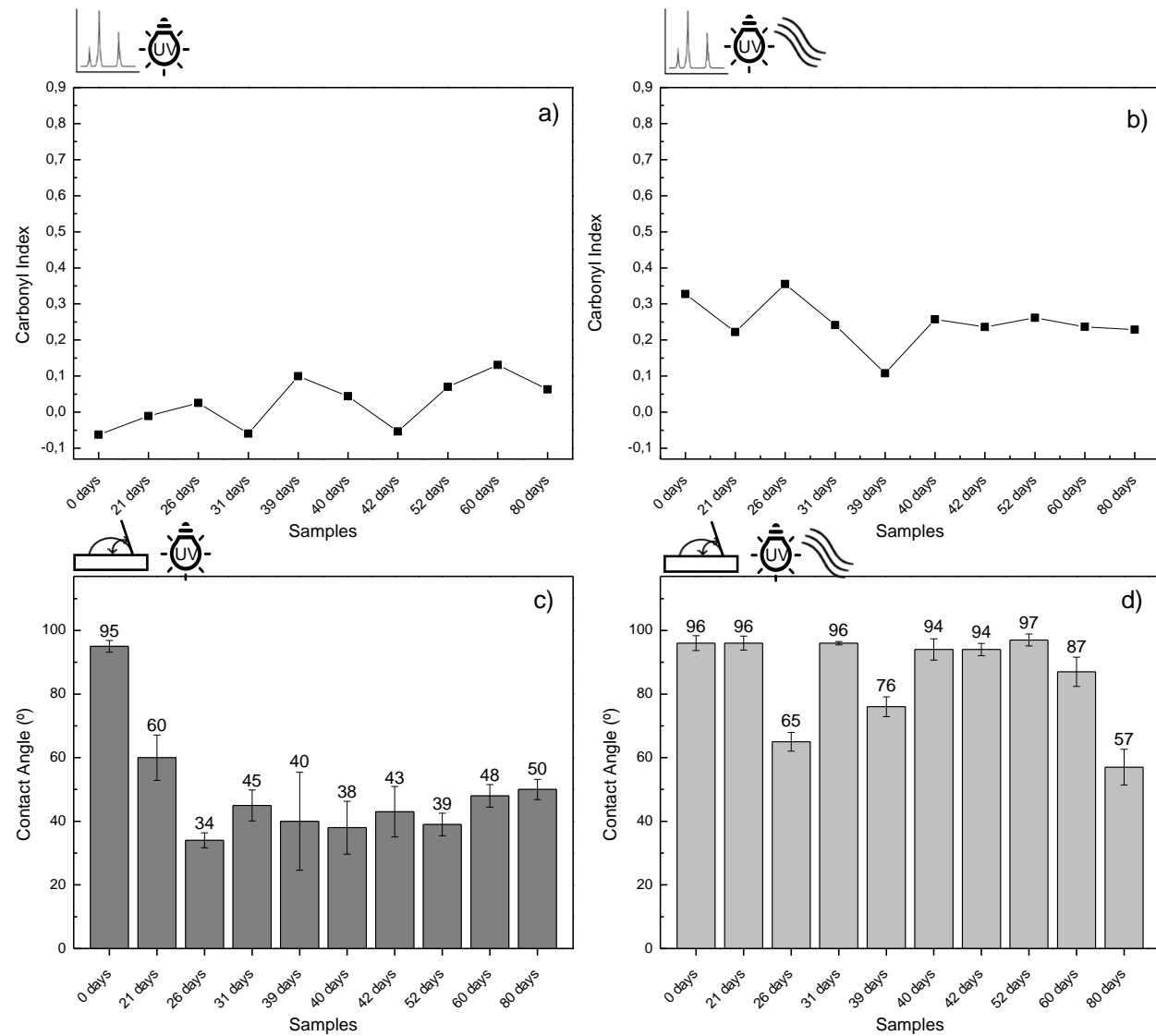


Figure 8: a) Carbonyl index of UV degraded black and white 1, black part; b) Carbonyl index of UV degraded combined with abrasion black and white 1, black part; c) Contact angle of UV degraded black and white 1, black part; d) Contact angle of UV degraded combined with abrasion black and white 1, black part.



# NON-AGED

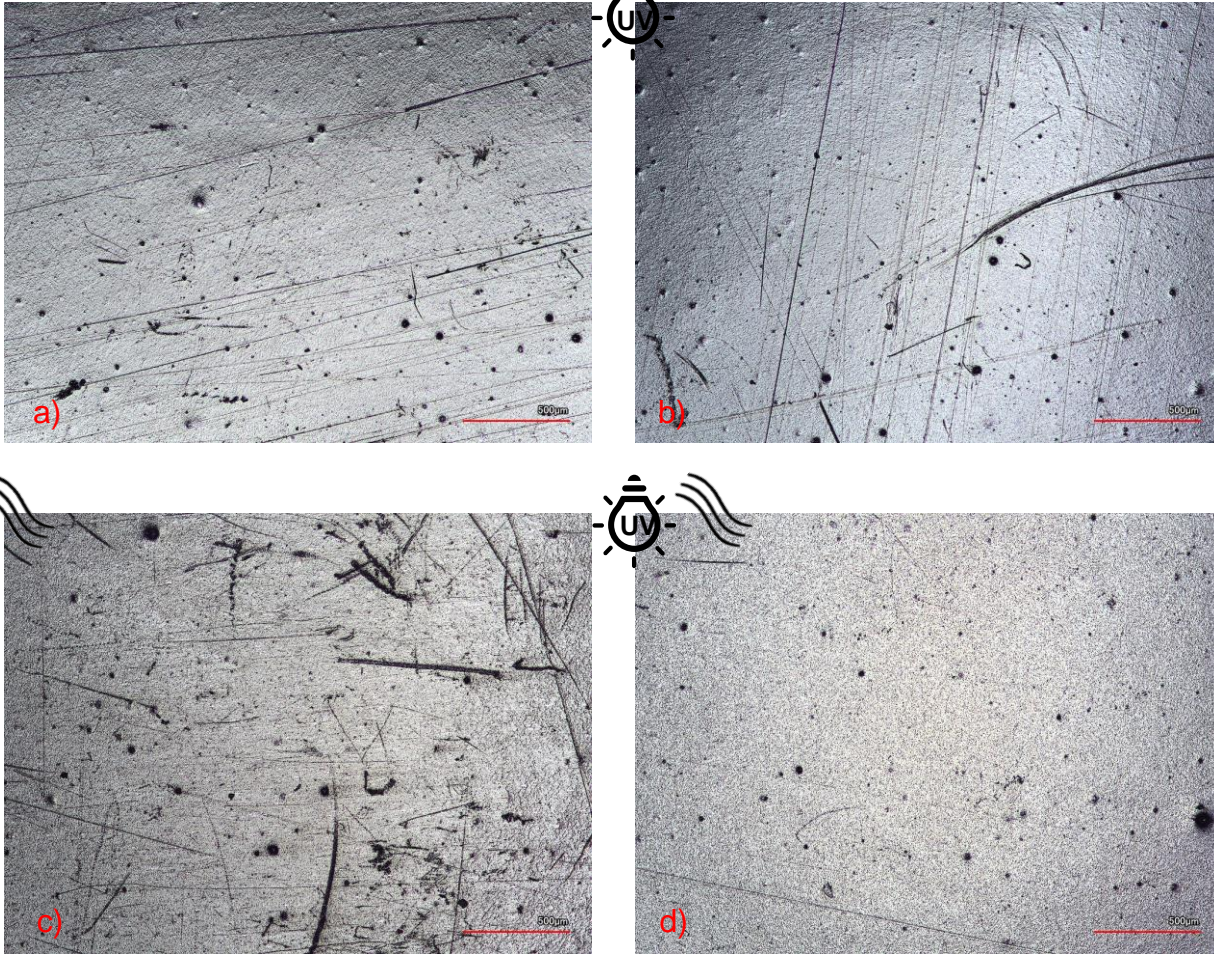


Figure 9: Laser scanning microscope images, 500 μm. a) and b) Black and white 2, black part (150 μm), 0 and 80 days UV degraded, respectively; c) and d) Black and white 2, black part, 0 and 80 days UV degraded combined with abrasion, respectively.

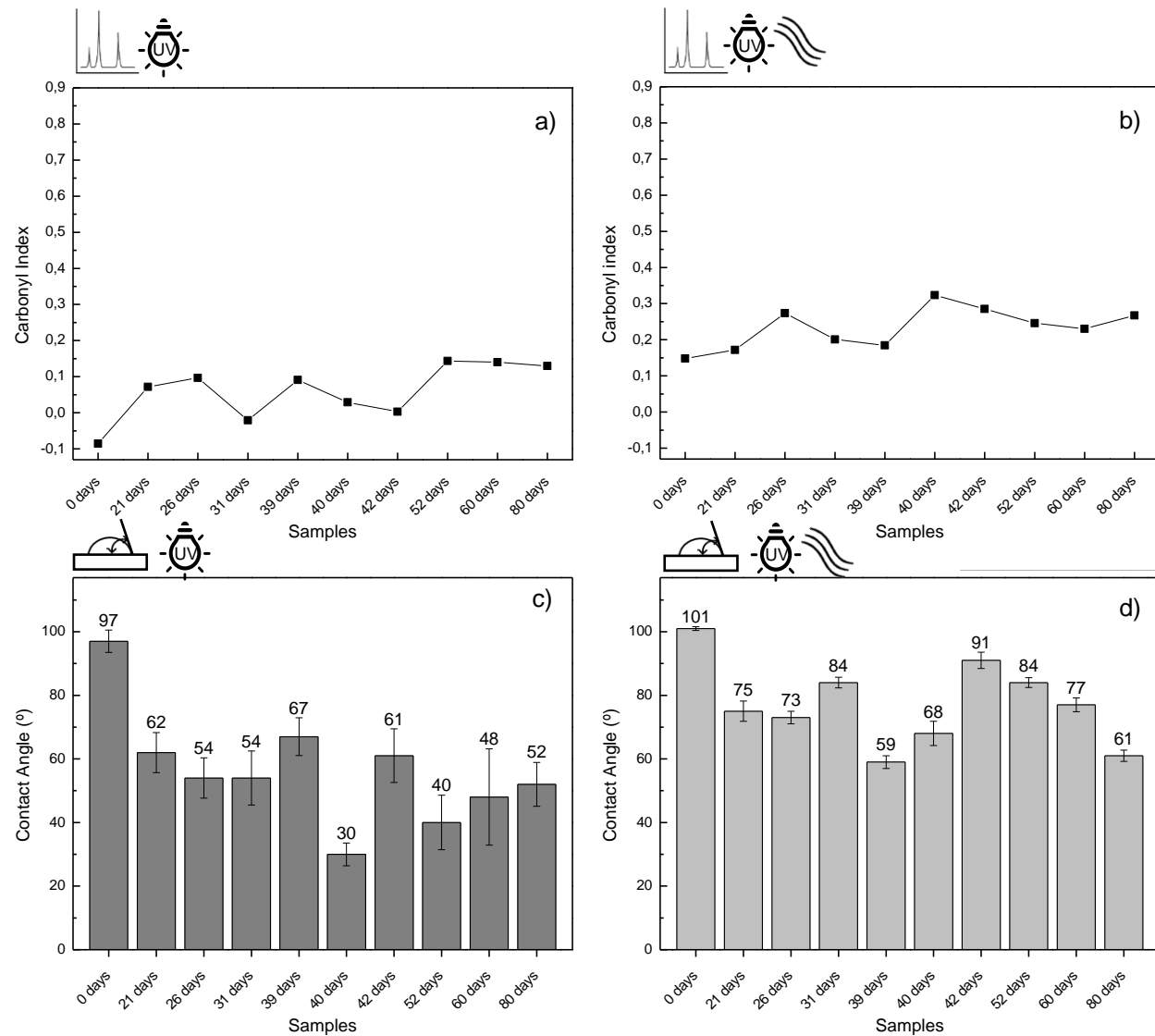


Figure 10: a) Carbonyl index of UV degraded black and white 2, black part; b) Carbonyl index of UV degraded combined with abrasion black and white 2, black part; c) Contact angle of UV degraded black and white 2, black part; d) Contact angle of UV degraded combined with abrasion black and white 2, black part.

# NON-AGED



Figure 11: Laser scanning microscope images, 500 μm. a) and b) Black and white 1, white part (100 μm), 0 and 80 days UV degraded, respectively; c) and d) Black and white 1, white part, 0 and 80 days UV degraded combined with abrasion, respectively.

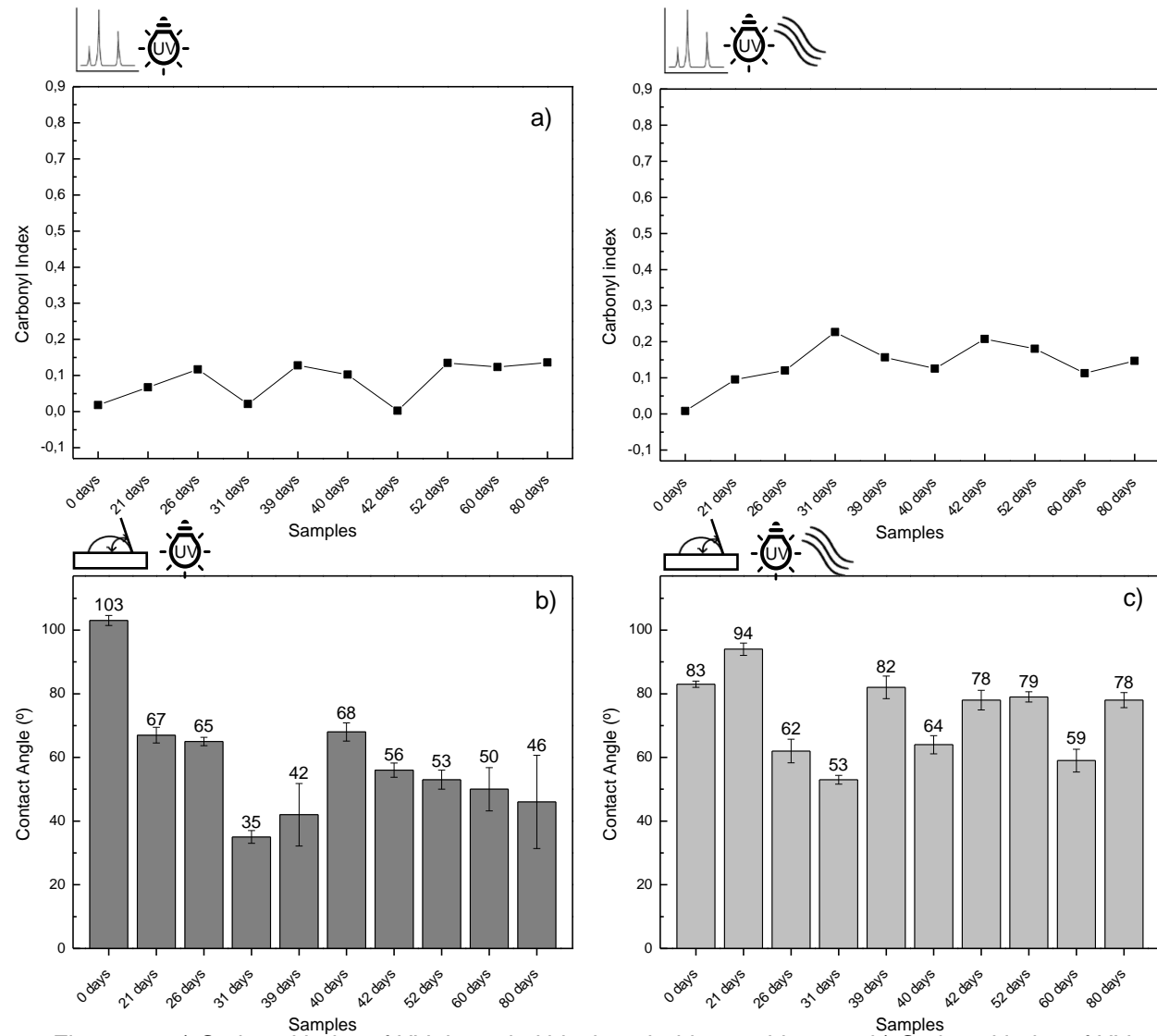


Figure 12: a) Carbonyl index of UV degraded black and white 1, white part; b) Carbonyl index of UV degraded combined with abrasion black and white 1, white part; c) Contact angle of UV degraded black and white 1, white part; d) Contact angle of UV degraded combined with abrasion black and white 1, white part.

# NON-AGED

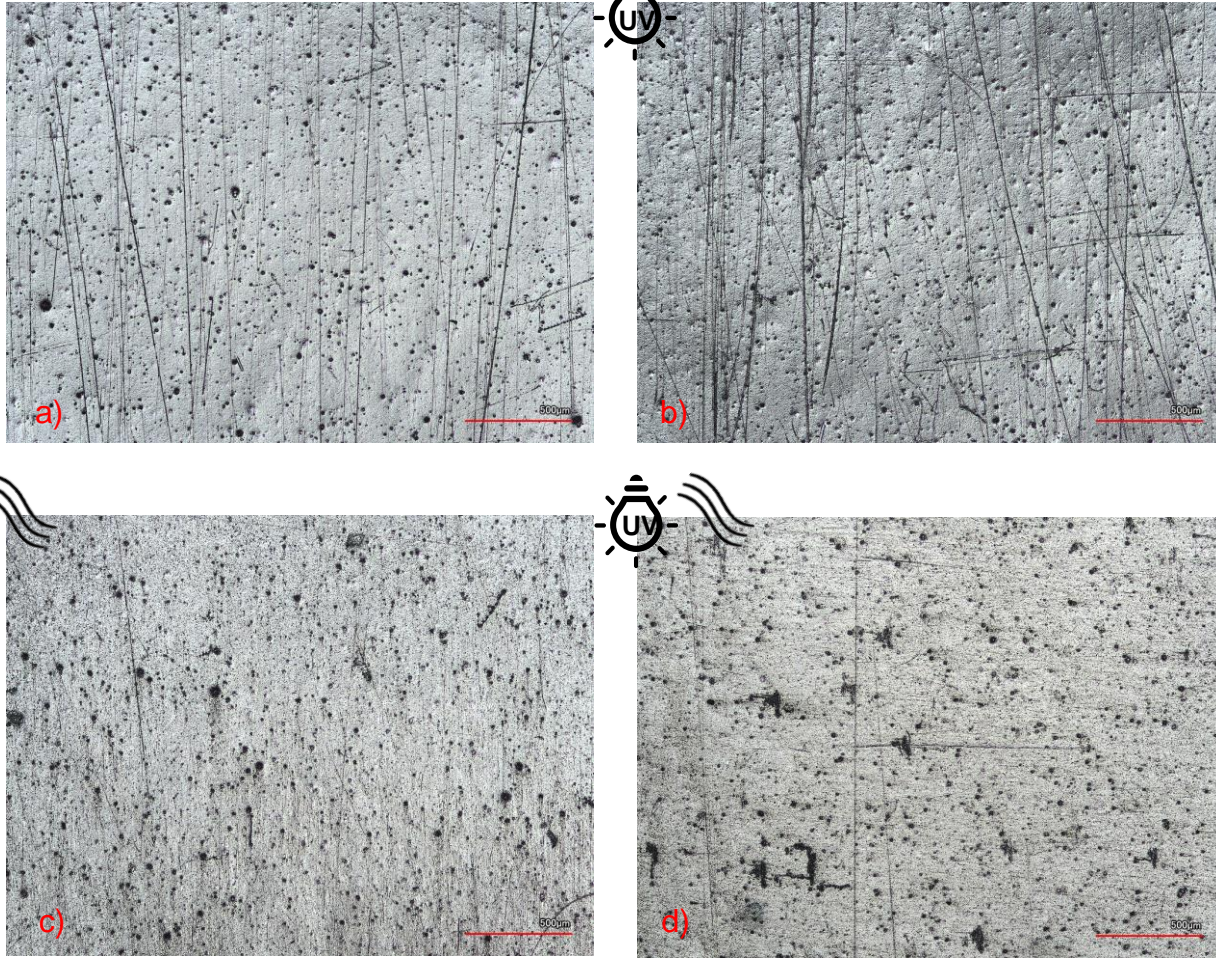


Figure 13: Laser scanning microscope images, 500 μm. a) and b) Black and white 2, white part (150 μm), 0 and 80 days UV degraded, respectively; c) and d) Black and white 2, white part, 0 and 80 days UV degraded combined with abrasion, respectively.

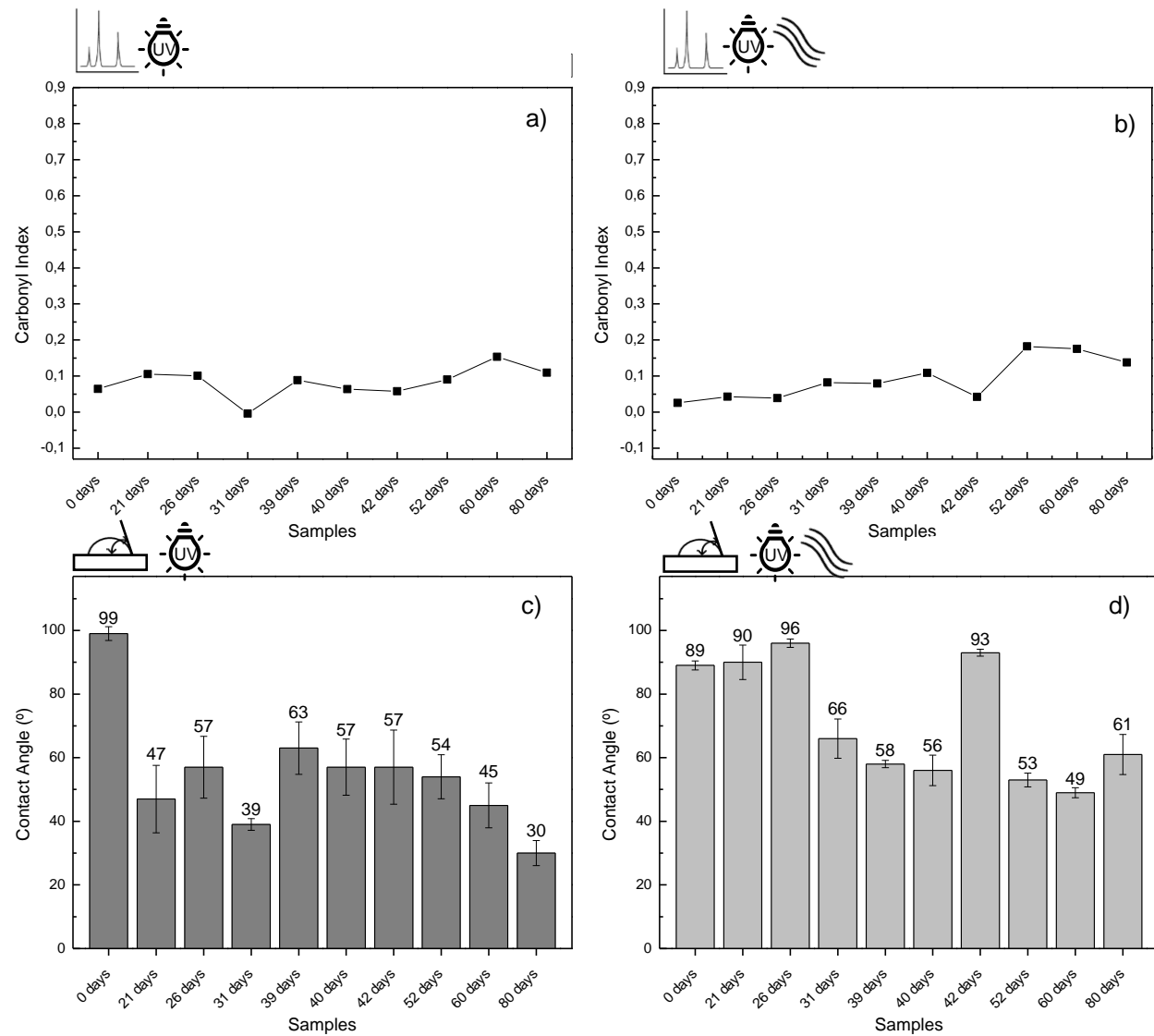


Figure 14: a) Carbonyl index of UV degraded black and white 2, white part; b) Carbonyl index of UV degraded combined with abrasion black and white 2, white part; c) Contact angle of UV degraded black and white 2, white part; d) Contact angle of UV degraded combined with abrasion black and white 2, white part.