



# i9MASKS

## Group:

Ana Catarina Gomes  
Ana Rita Simões  
João Magalhães  
Rita Gomes

# Characterization of PDMS (Sylgard 184)



Universidade do Minho  
Escola de Engenharia

Tutors: Delfim Soares; Rui Lima; Senhorinha Teixeira

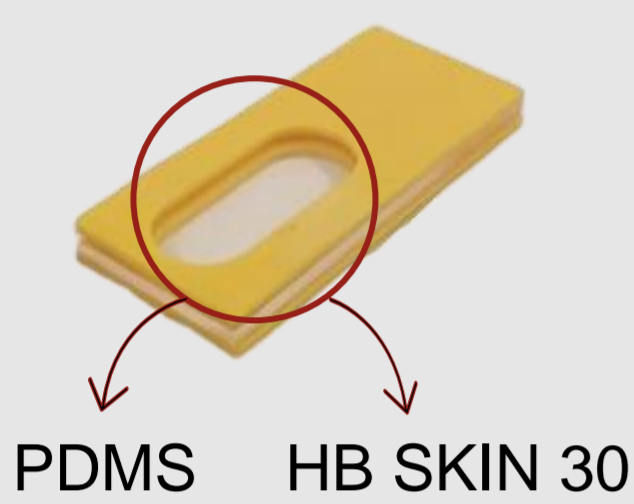
## Introduction

### General characteristics of PDMS [1]-[3]

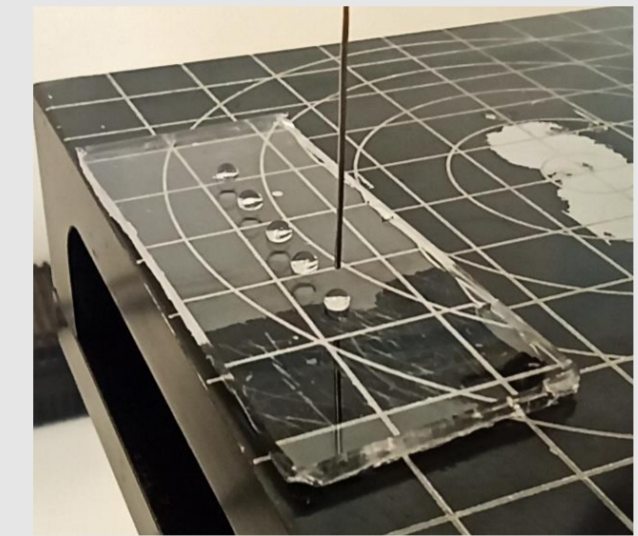
Transparency    Biocompatibility    Gas permeability    Low cost    Fast simple fabrication    Eco-friendly

## Materials and methods

### Spectrophotometry



### Contact goniometry



### DMA



### Elemental Analysis



### Calorific Value Test



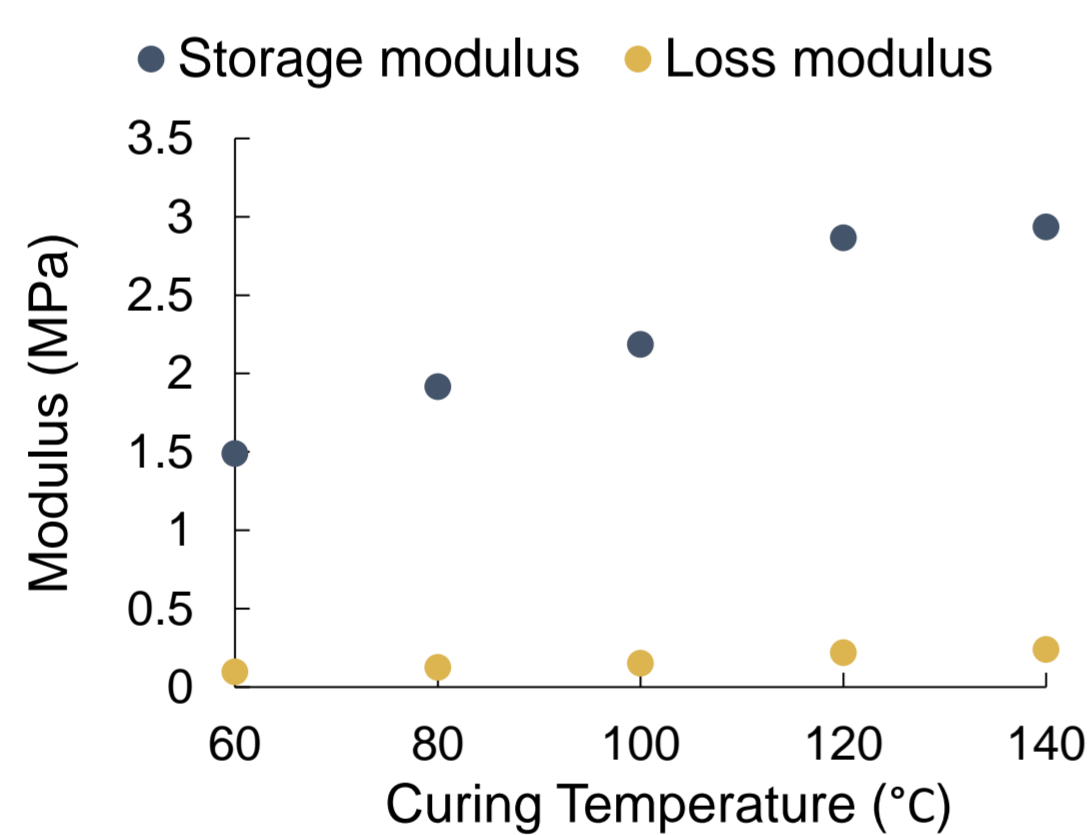
Crosslinking and Curing  
Temperature Effect

Energetic Valorization

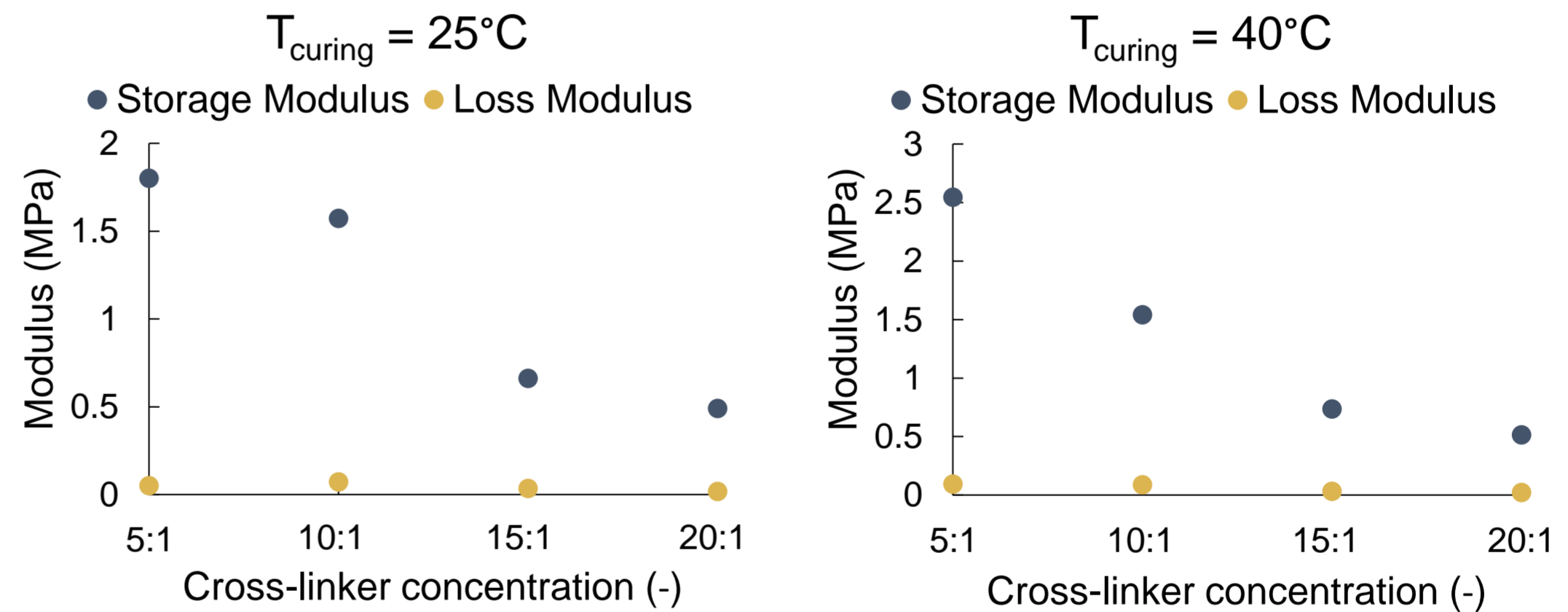
## Results and Discussion

### DMA (Dynamic Mechanical Analysis)

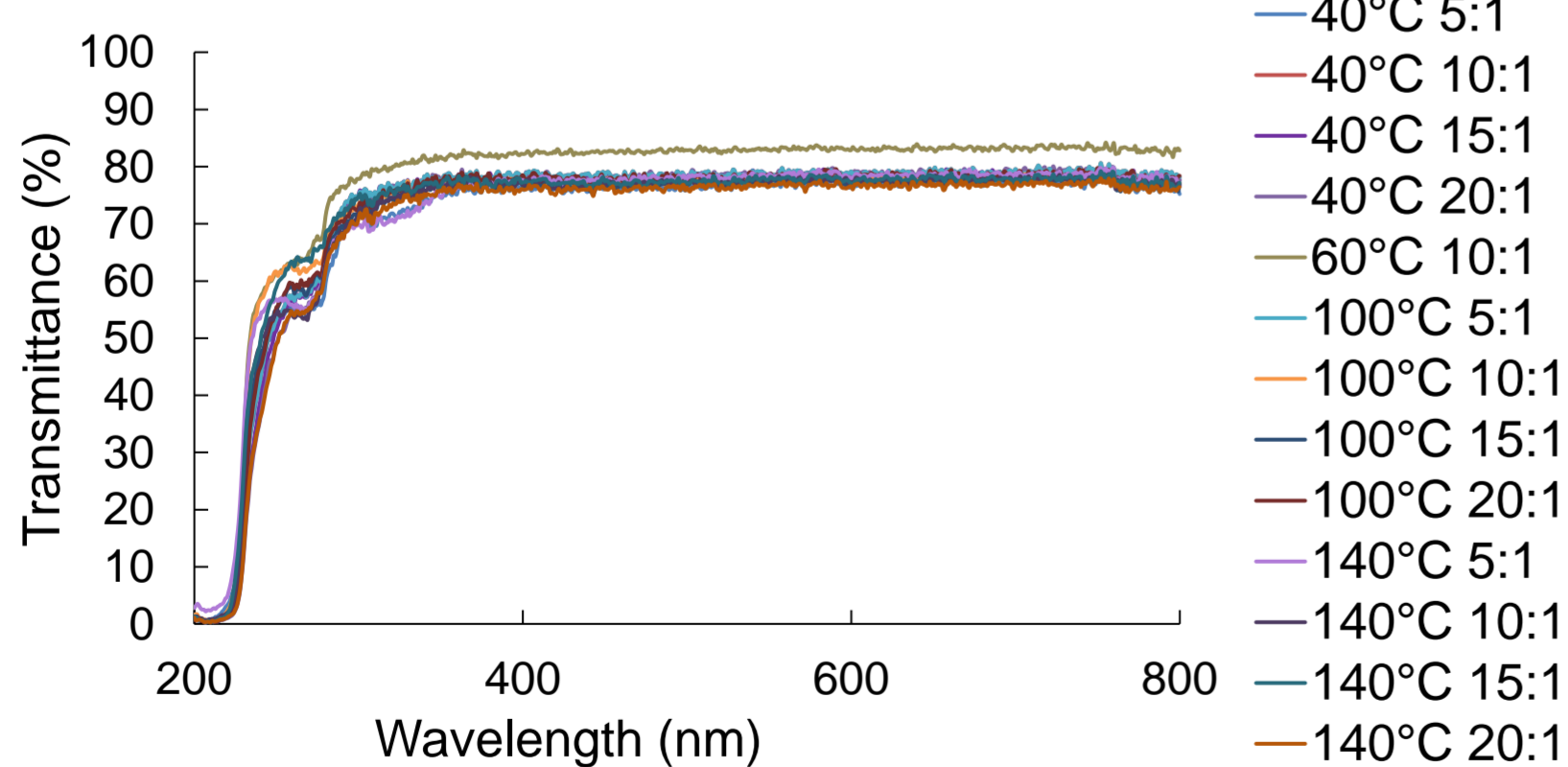
#### Curing Temperature Effect



#### Cross-linker concentration Effect



### Spectrophotometry

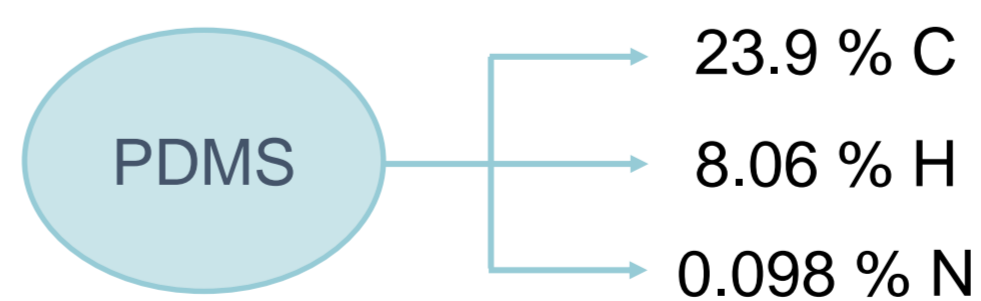


### Contact goniometry

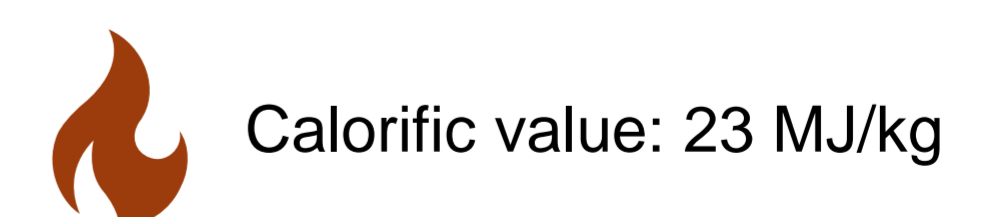
Table 1 – Mean value of wetting contact angle between water droplet and PDMS surfaces.

	5:1	10:1	15:1	20:1
40°C	125.66 ± 3.74	124.54 ± 2.24	120.96 ± 3.16	127.34 ± 0.56
100°C	119.86 ± 2.96	122.82 ± 4.32	125.78 ± 2.32	124.34 ± 3.86
140°C	116.93 ± 3.57	114.3 ± 7.8	113.8 ± 2.5	124.61 ± 1.53

### Elemental Analysis



### Calorific Value Test



## Future work suggestions

- Biodegradability tests;
- Superficial treatment of PDMS → Measurement of wetting contact angle.

## References

- [1] - I. D. Johnston, D. K. McCluskey, C. K. L. Tan, and M. C. Tracey, "Mechanical characterization of bulk Sylgard 184 for microfluidics and microengineering", J. Micromechanics Microengineering, vol. 24, no. 3, 2014, doi: 10.1088/0960-1317/24/3/035017.
- [2] - E. Rubino and T. Ioppolo, "Young's modulus and loss tangent measurement of polydimethylsiloxane using an optical lever", J. Polym. Sci. Part B Polym. Phys., vol. 54, no. 7, pp. 747-751, Apr. 2016, doi: 10.1002/polb.23972.
- [3] - J. Kuncová-Kallio, P. J. Kallio, "PDMS and its suitability for analytical microfluidic devices.", Annual International Conference of the IEEE Engineering in Medicine and Biology - Proceedings, 2006, pp. 2486-2489, doi: 10.1109/IEMBS.2006.260465.