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BOOKLET

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Title: Thin-films microstructuration through photolithography

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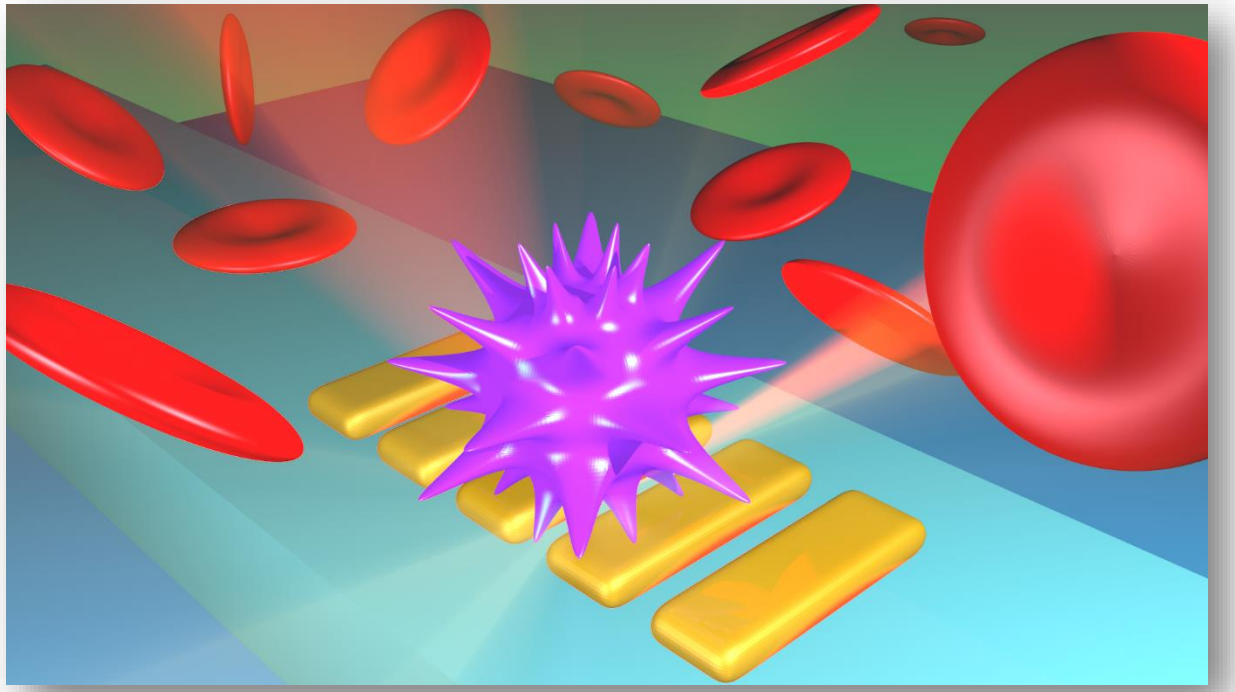
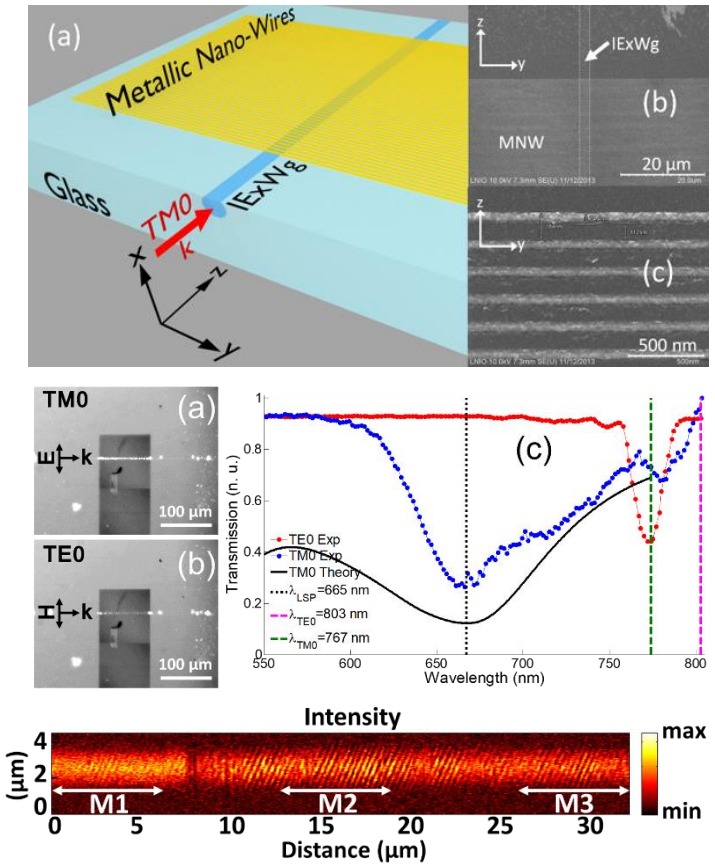
Introduction

Integrated metaphotonic devices for lab-on-a-chip applications

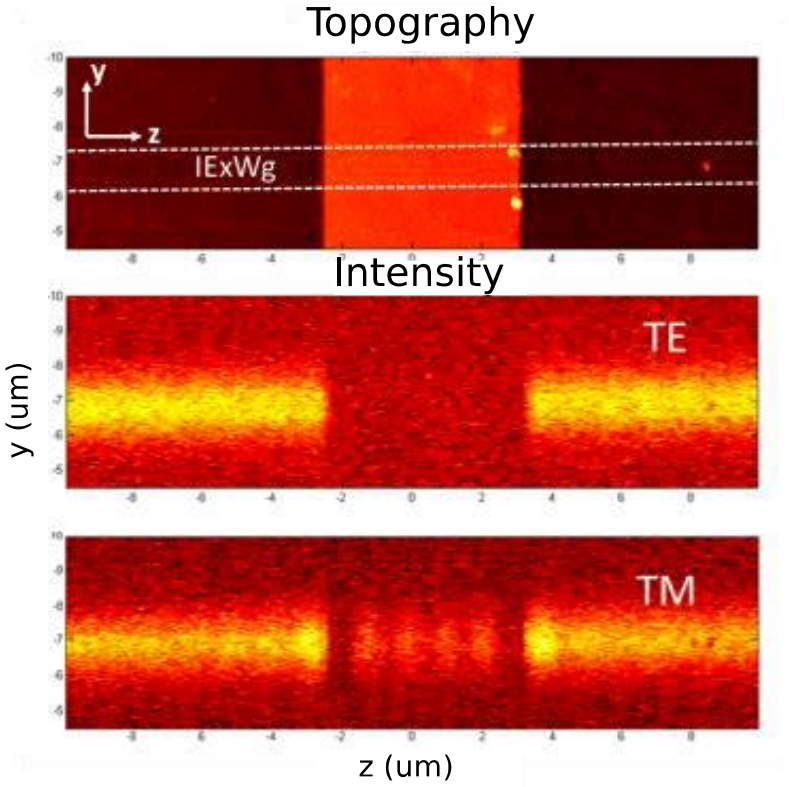


Introduction

Integrated metaphotonic devices



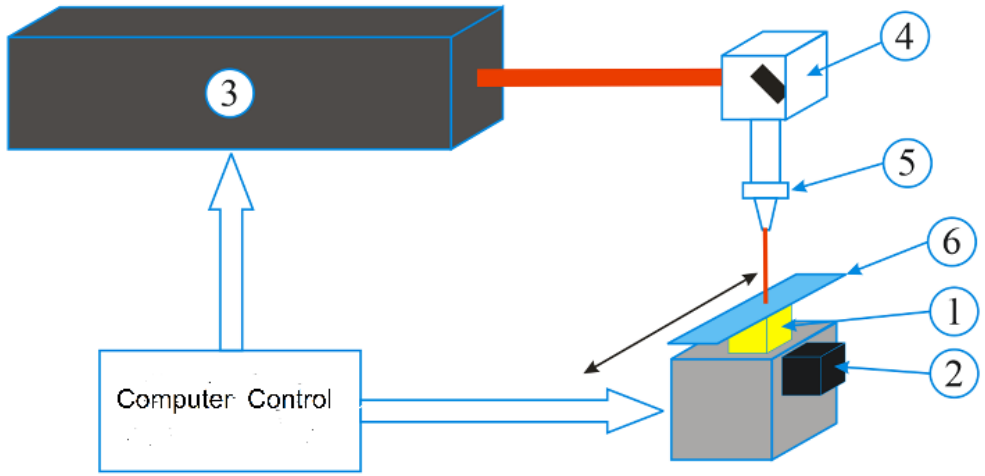
R. Tellez-Limon, et. al. Submitted to Physica Status Solidi B (august 2019).



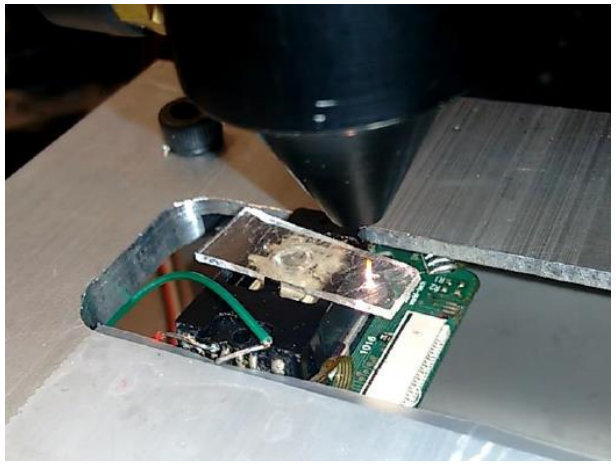
R. Tellez-Limon, et. al. In preparation (october 2019).

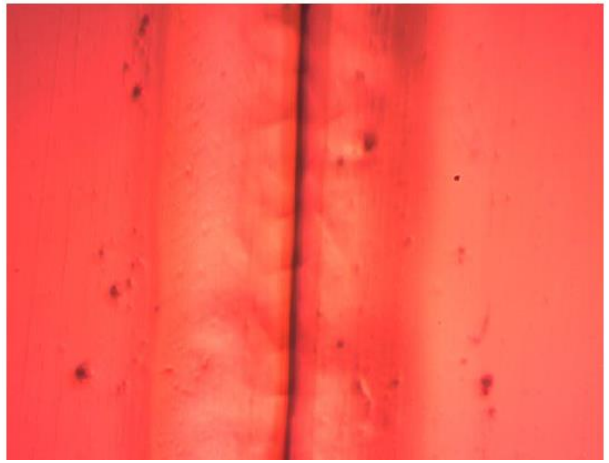
Introduction

Fabrication of photonic waveguides for integrated plasmonics



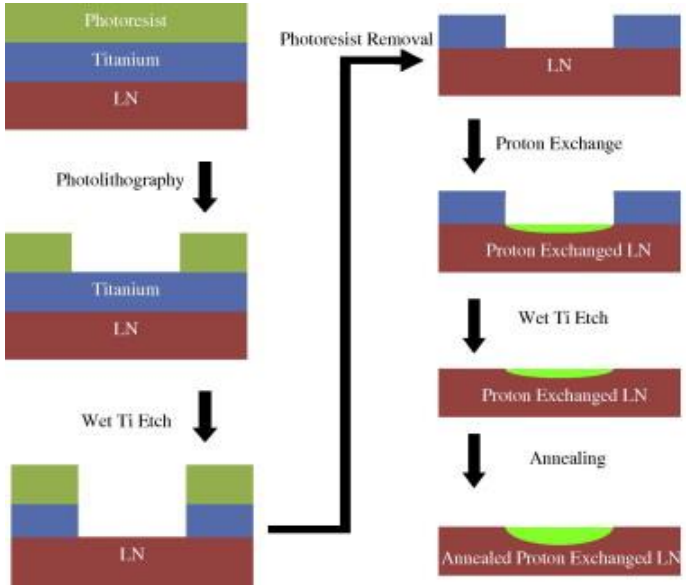
R. Lopez, R. Tellez-Limon, V. Coello,
ECORFAN Journal Taiwan 2 (3), 23-28 (2018)

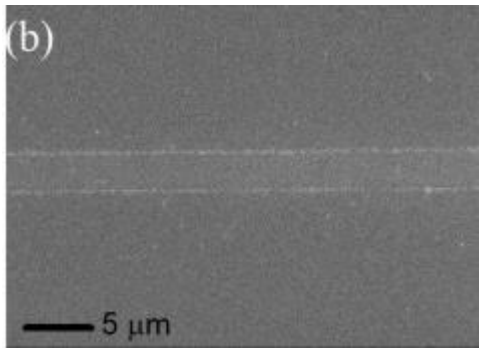




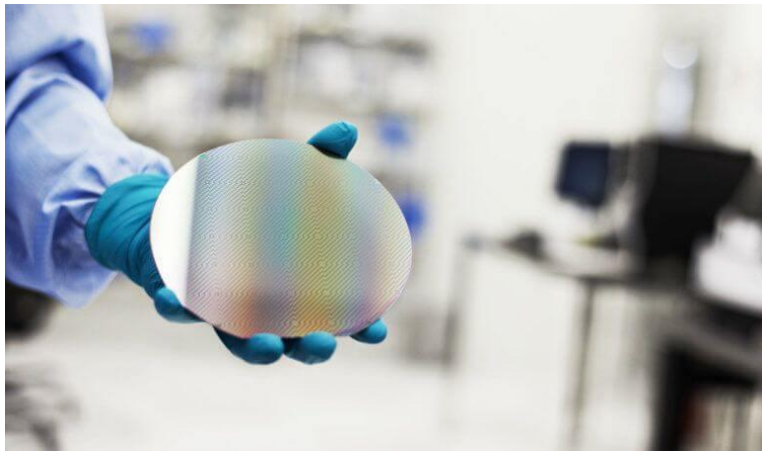
Introduction

Fabrication of waveguides through photolithography





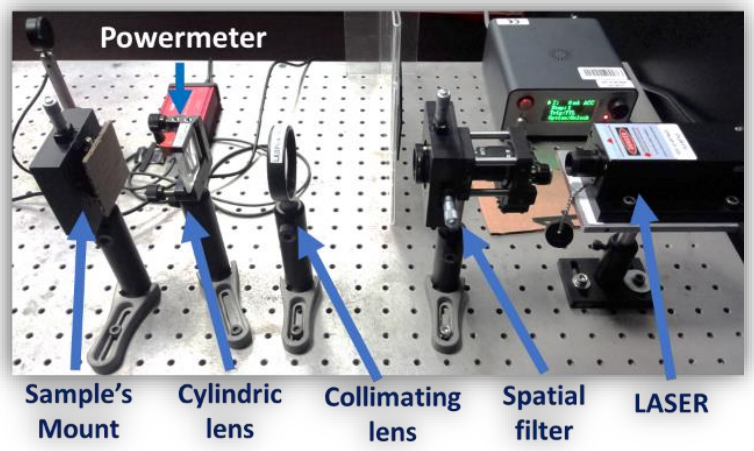
O. Yavuzcetin, et. al. Optical Materials 36(2)372-375 (2013)

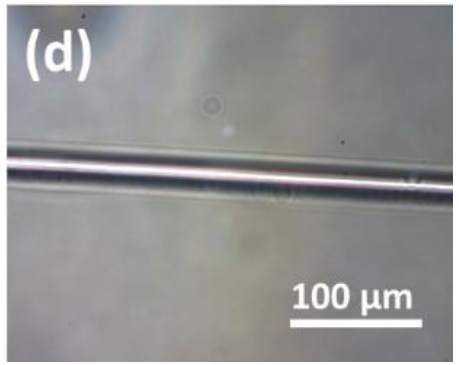


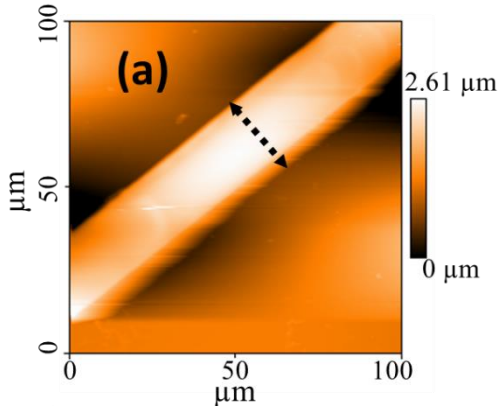
Nanoimprint lithography, NIL Technology

Objective

To develop a low-cost photolithography setup and experimentally determine a recipe for SU-8 patterning.

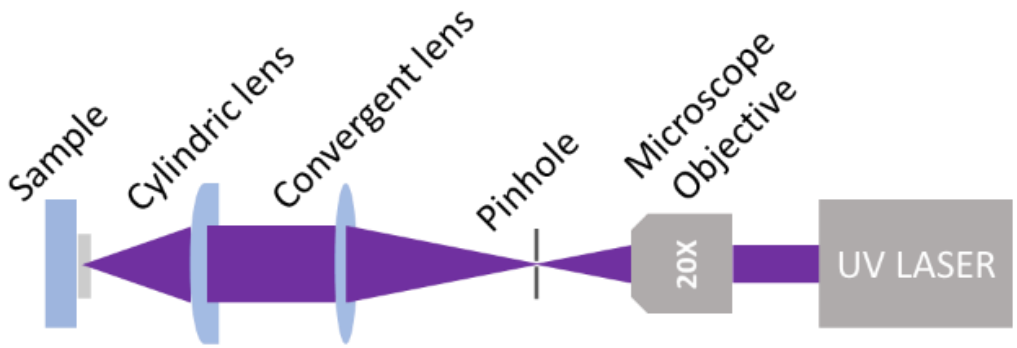


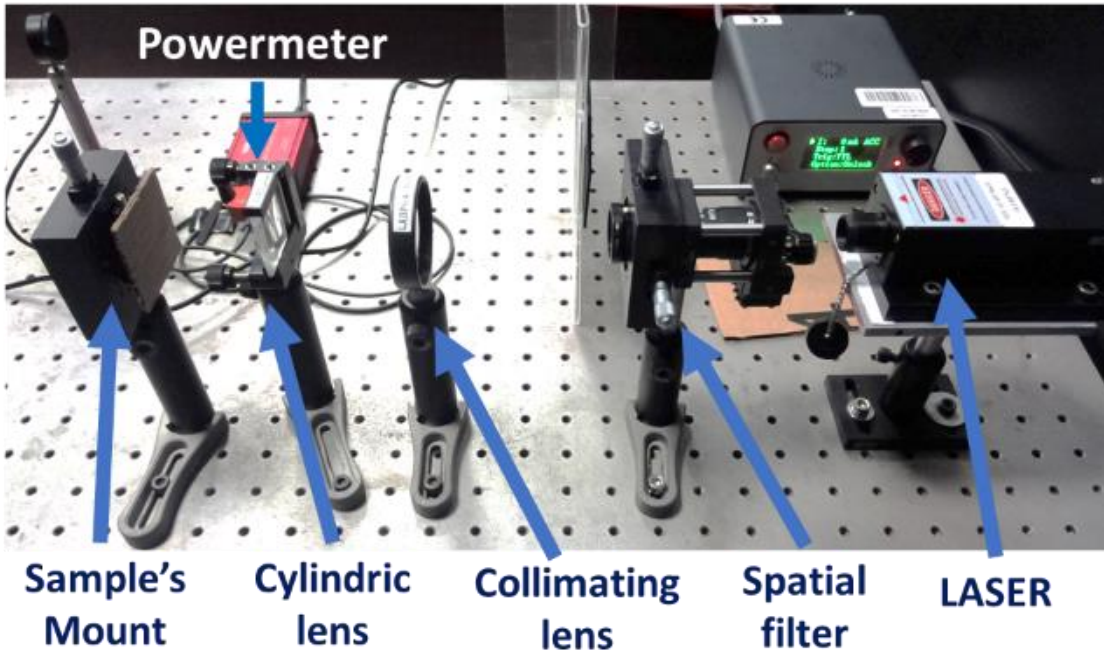




Methodology

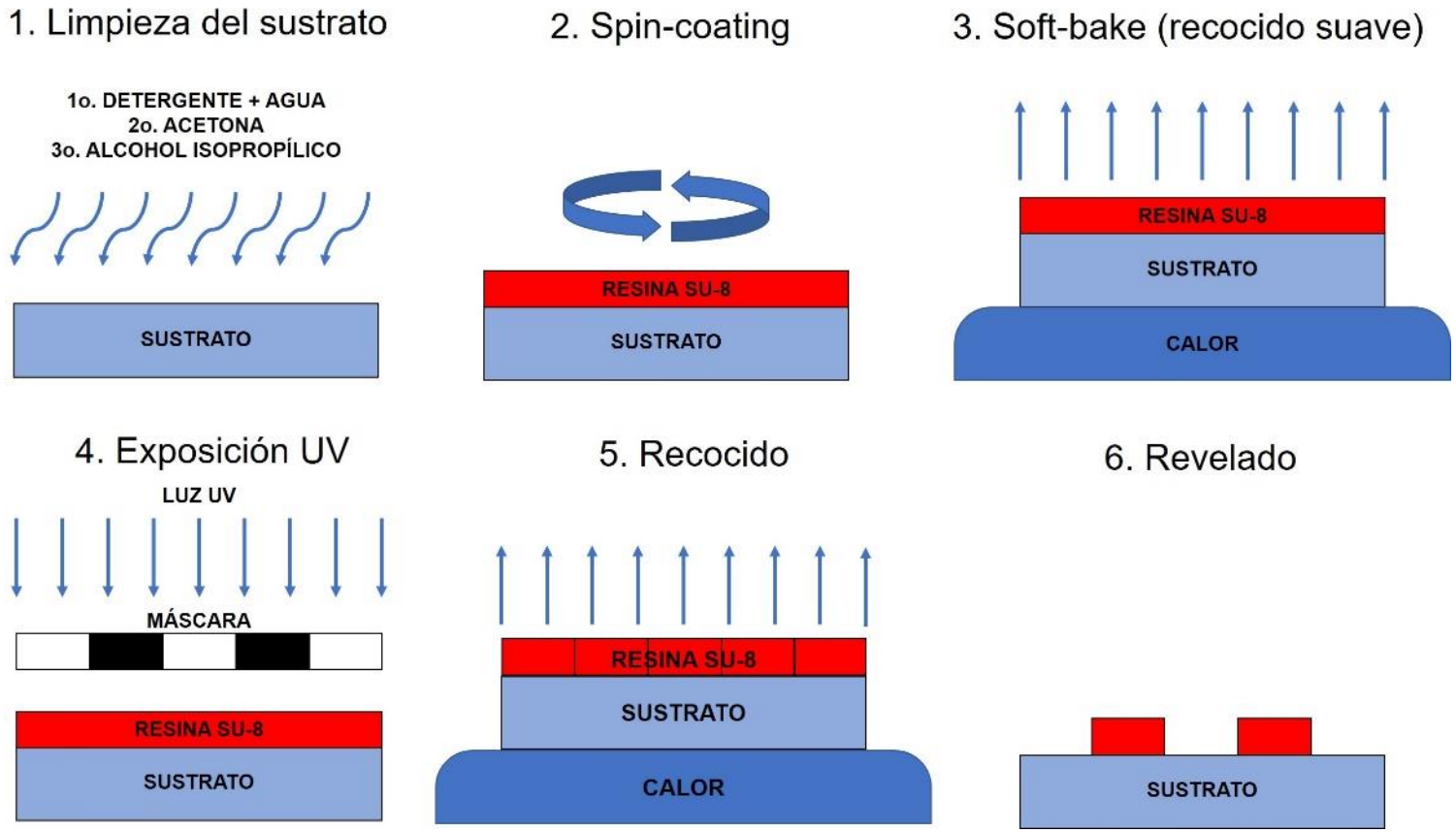
Experimental setup





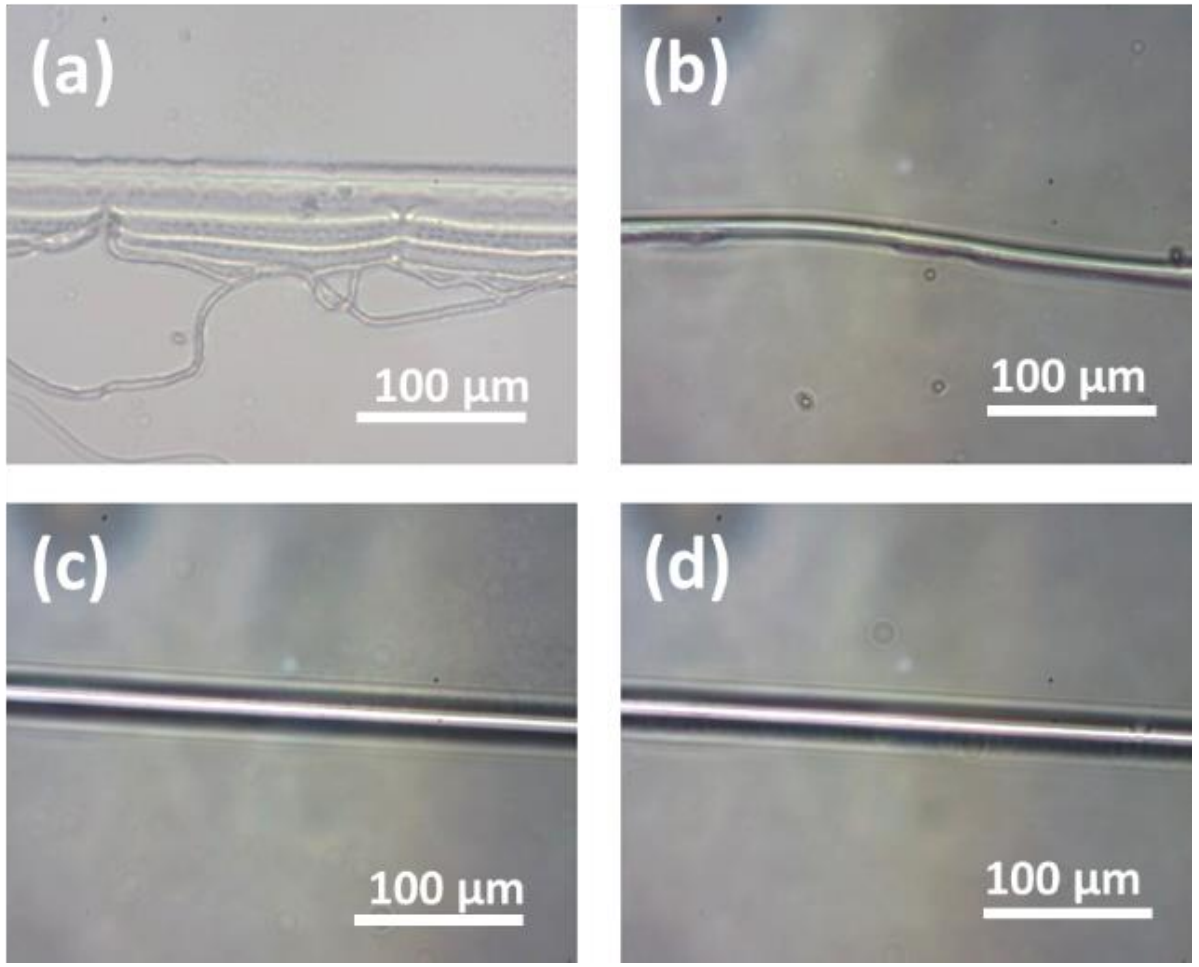
Methodology

Photolithography process



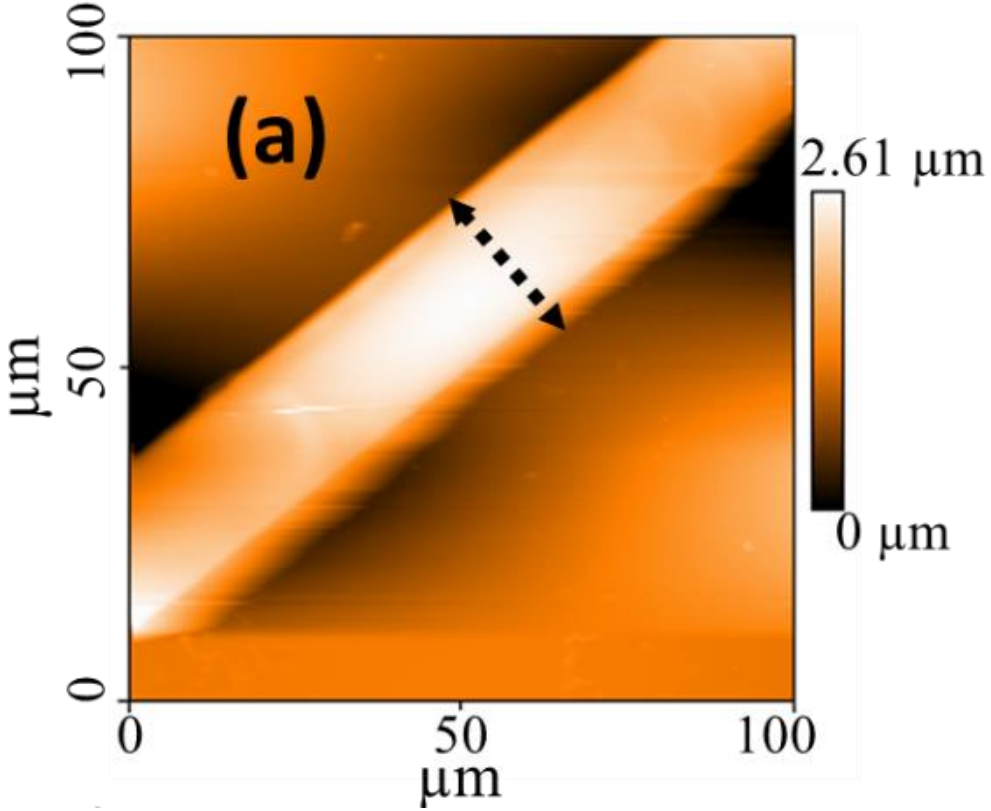
Results

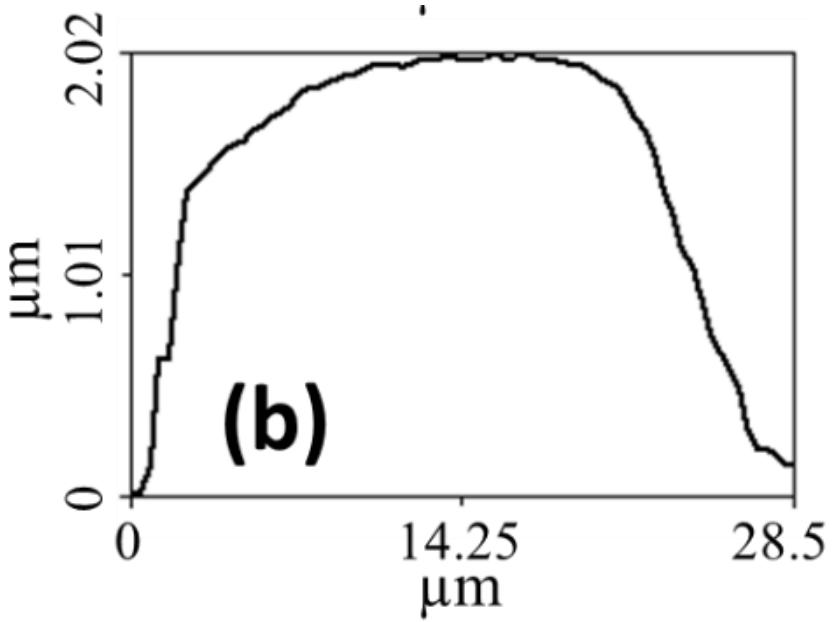
Optical microscopy characterization



Results

AFM characterization





Results

Fluence versus width of the waveguide

Optical Power (mW)	Exposure time (s)	Optical energy (mJ)	Width (µm)
40	35	1400	29.9
40	40	1600	28.5
40	45	1800	29.2
40	50	2000	23.8

Conclusions

- The optimal fluence (optical energy) for SU-8 patterning should be between 1400 mJ and 2000 mJ.

- We were able to print lines of 28 µm (average) with our photolithography system.

- The resolution can be improved by properly focusing the light beam into the sample. This requires a numerically controlled stage.

- The obtained results open new perspectives for the fabrication of metamaterials at CICESE-Monterrey.

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