Bio-inspired microstructures for directional liquid transport

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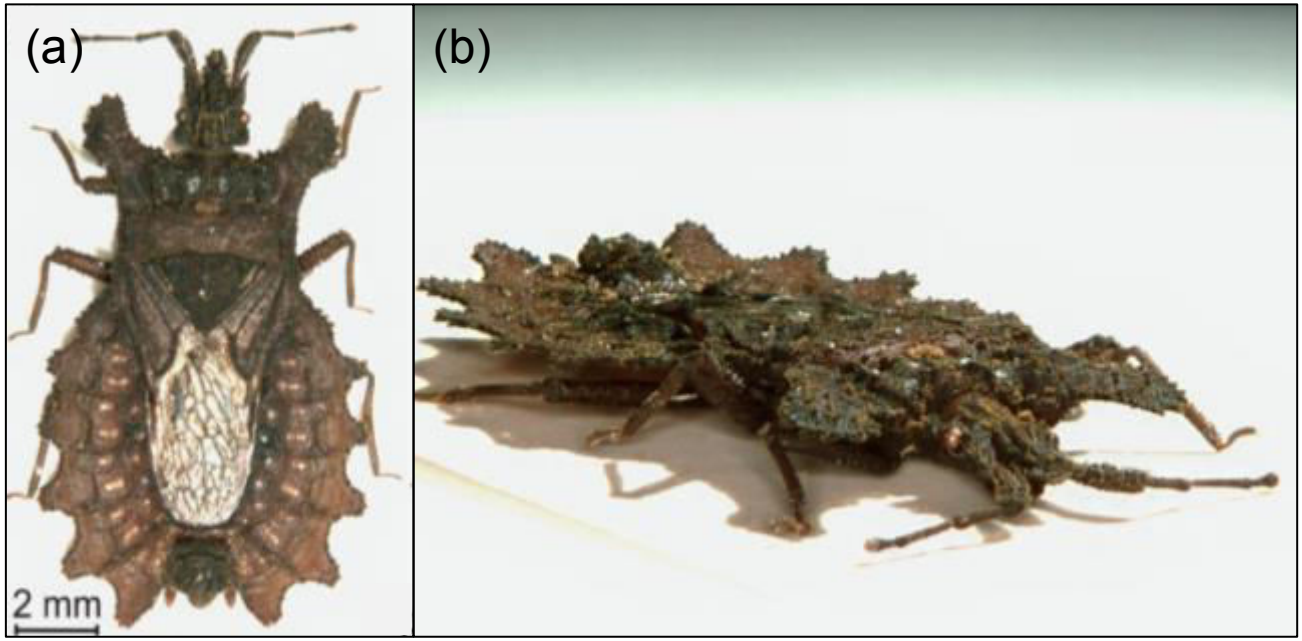
Table of contents

1. Introduction
2. Materials and methods
3. Results
4. Discussion and conclusion
5. Summary
6. Other applications…

1. Introduction

Dysodius lunatus (***Aradidae* family**, South- and Central America)

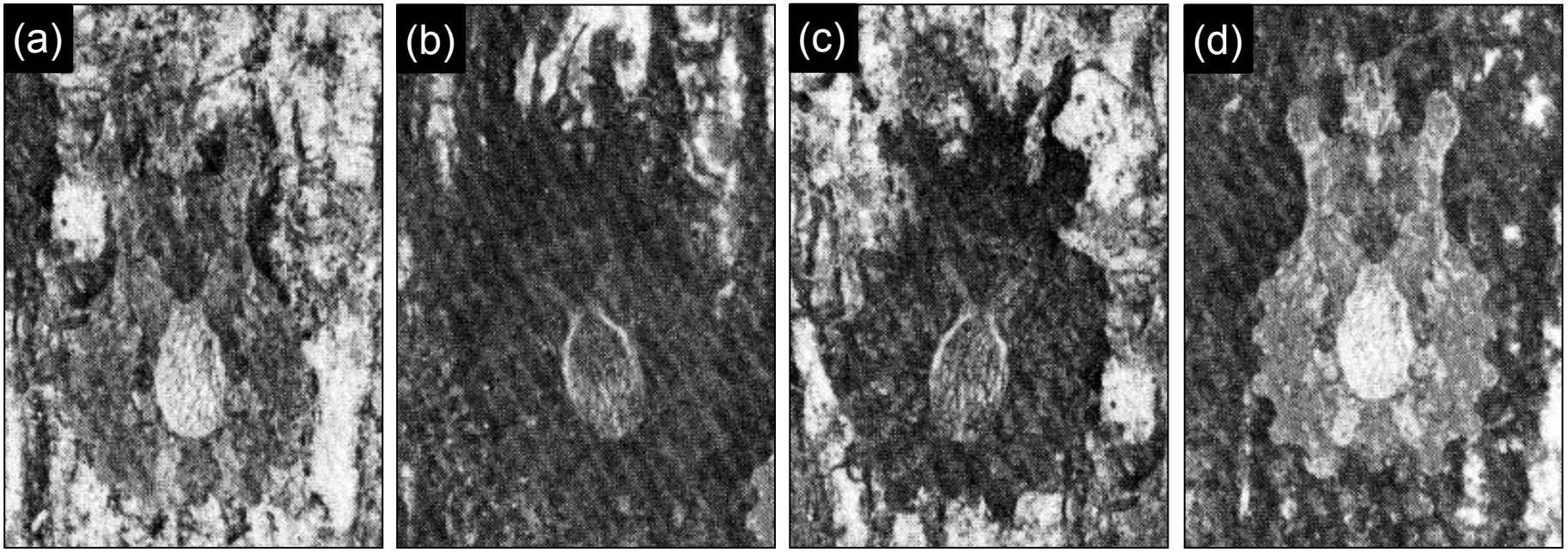
Kingdom: *Animalia*
Phylum: *Arthropoda*
Class: *Insecta*
Order: *Hemiptera*
Suborder: *Heteroptera*
Infraorder: *Pentatomomorpha*
Superfamily: *Aradoidea*
Family: *Aradidae*
Spinola, 1837 (Wikipedia)



Dysodius lunatus (courtesy of Florian Hischen)

1. Introduction

Dysodius lunatus (***Aradidae* family**, South- and Central America)



(a) Dry bug, dry bark; (b) wet bug, wet bark; (c) wet bug, dry bark; (d) dry bug, wet bark (R. Silberglied and A. Aiello, 1980).

1. Introduction

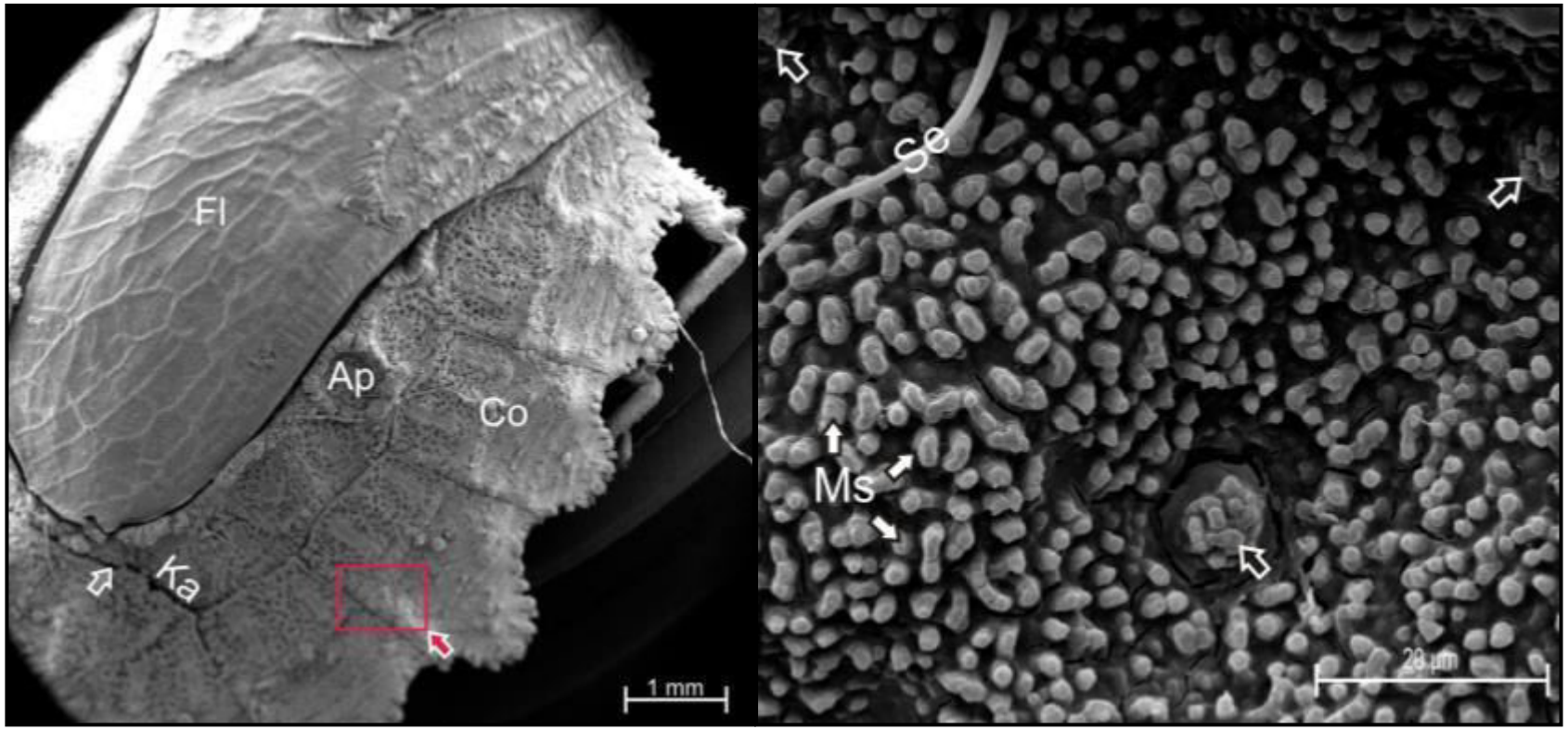
Dysodius lunatus (***Aradidae* family**, South- and Central America)



Wetting of *Dysodius lunatus*. (V. Reiswich, D. Kupsch, Master Theses, RWTH Aachen (2013/2014).

1. Introduction

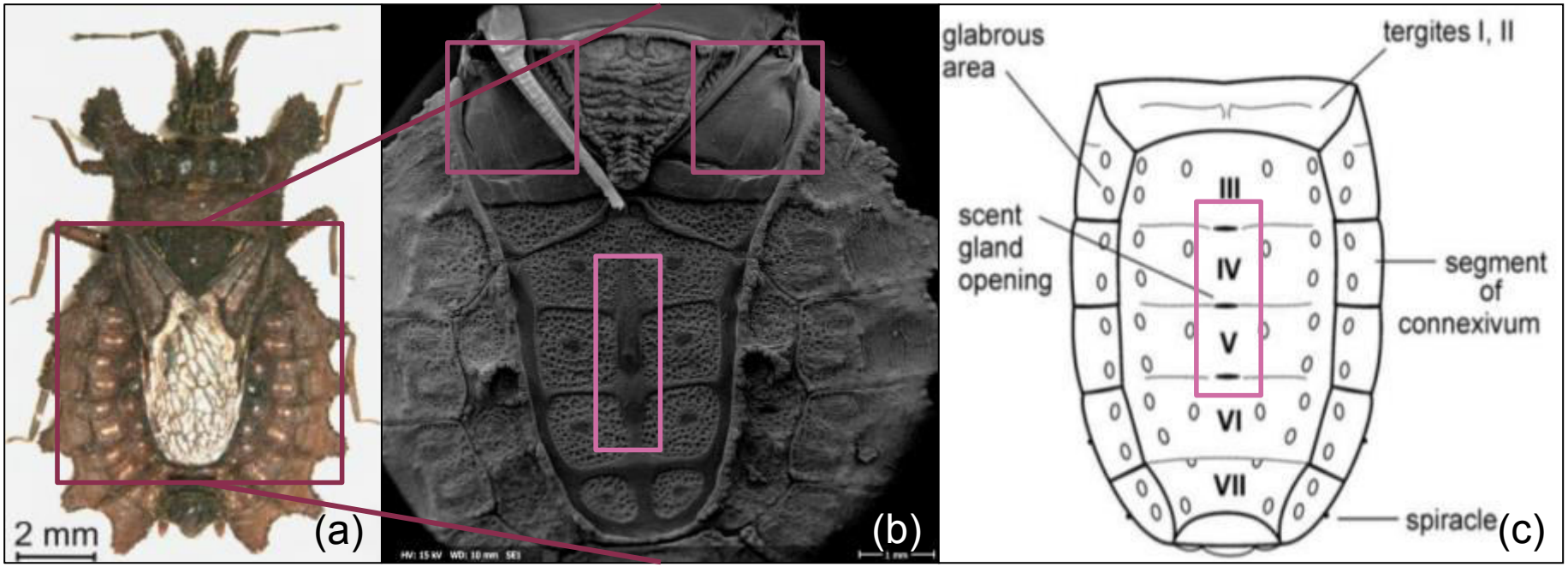
Dysodius lunatus (***Aradidae* family**, South- and Central America)



SEM-images of the dorsal surface of *Dysodius lunatus* (V. Reiswich, D. Kupsch, Master theses, RWTH Aachen (2013/2014).

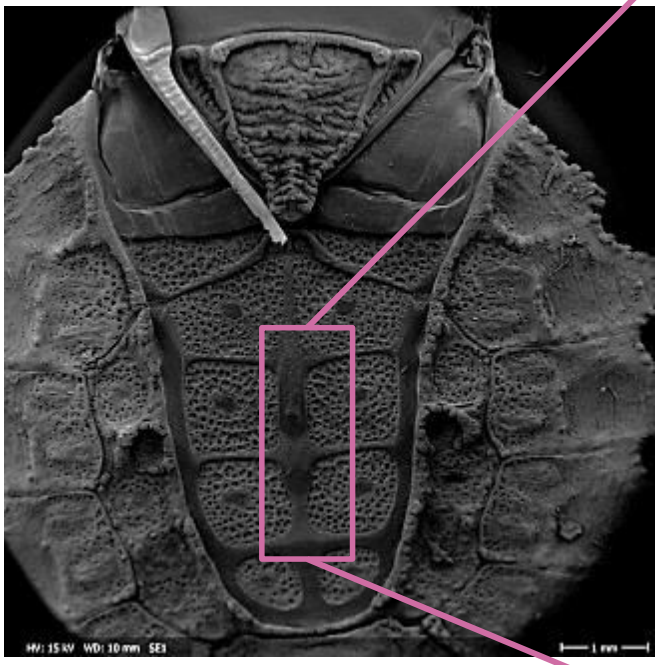
1. Introduction

Dysodius lunatus (*Aradidae* family, South- and Central America)

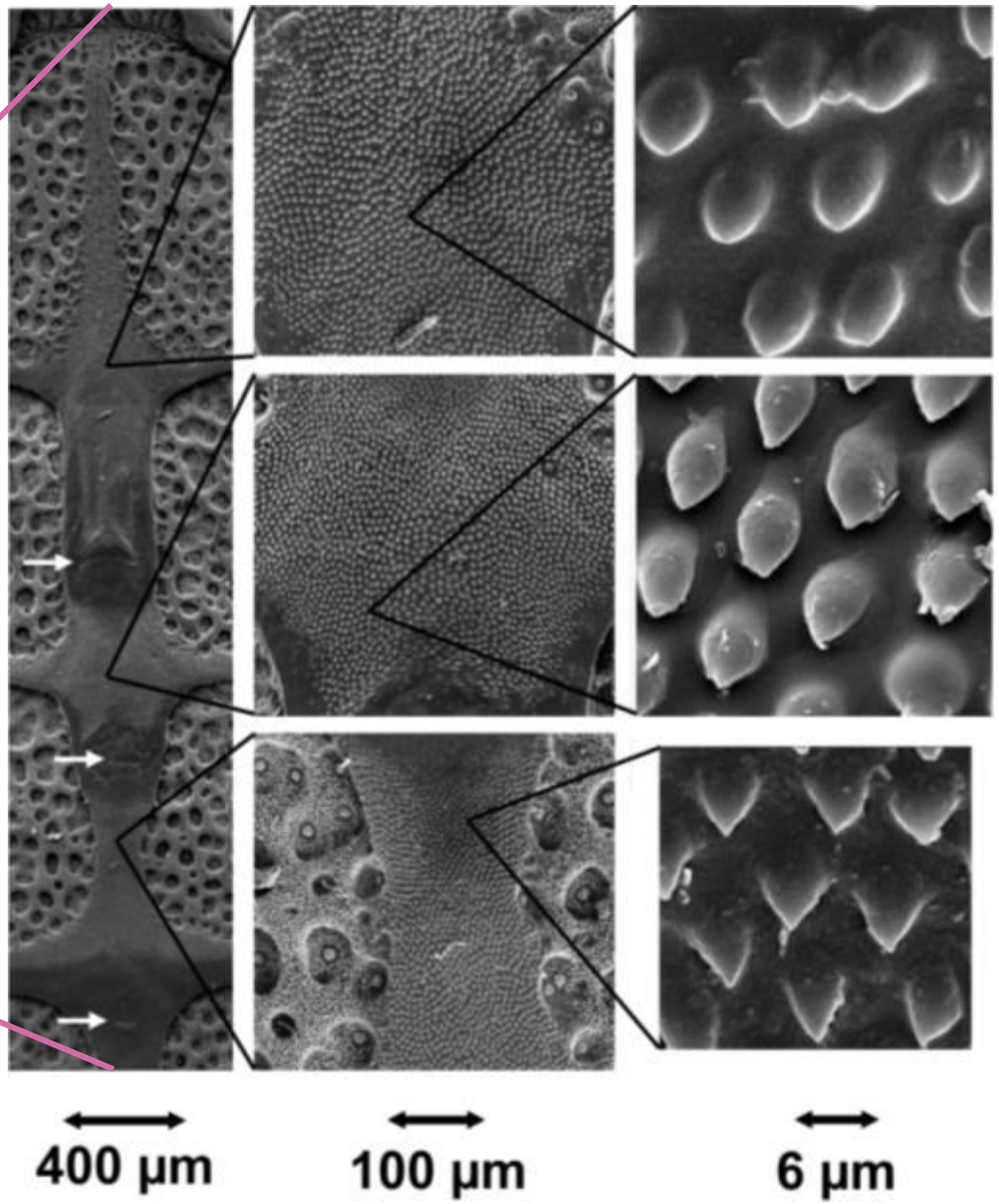


(a) Optical image of *Dysodius lunatus*, (b) SEM micrograph of the *D. lunatus'* cuticle under the wing, (c) *Aradidae* main features of abdomen, dorsal view (M.C. Larivière & A. Larochelle, 2006).

1. Introduction



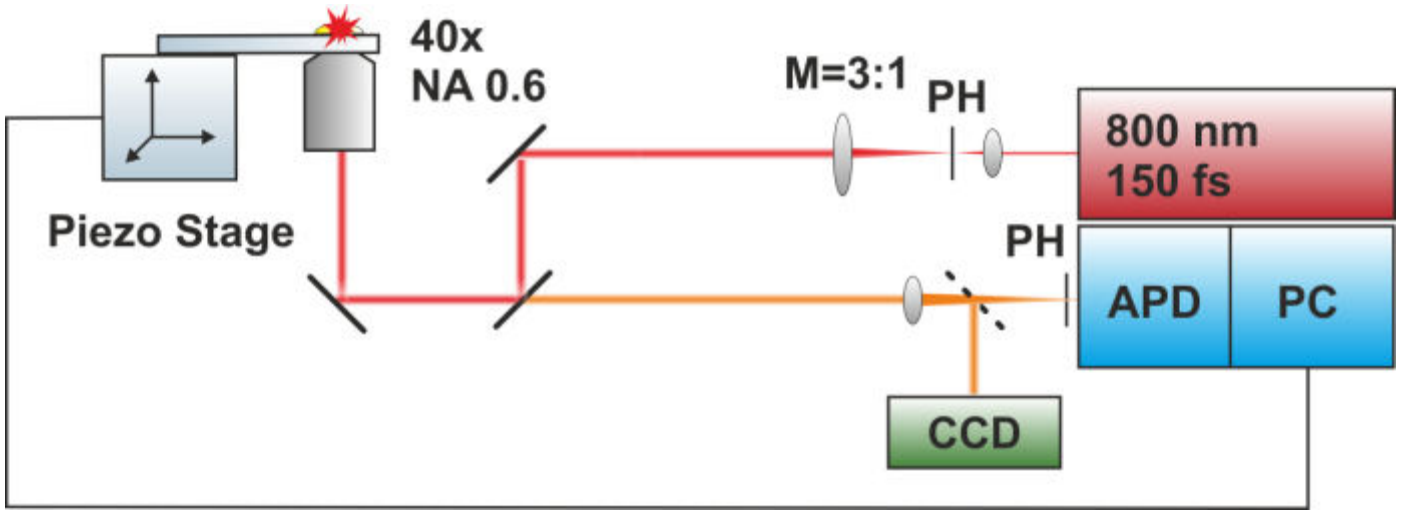
Scent gland system of *Dysodius lunatus* and the surrounding microstructures.



2. Materials and methods

Femtosecond laser for two photon absorption!

Experimental setup



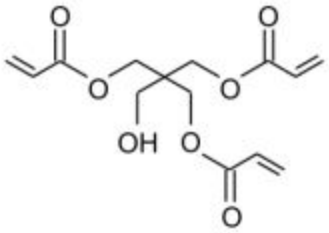
Laser parameters:

- Ti-sapphire laser 800 nm
- repetition rate 80 MHz
- pulse length 150 fs
- excitation power 20 mW

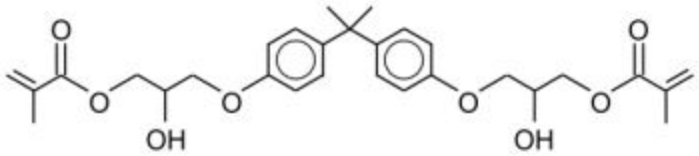
2. Materials and methods

Photoresist

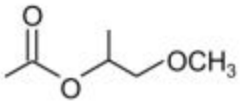
PETA



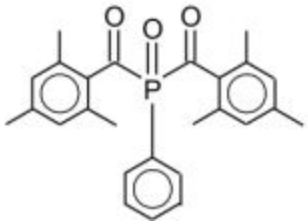
BisGMA



PGMEA

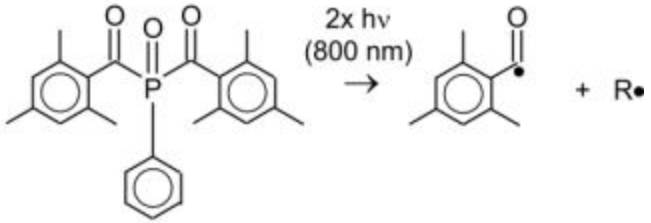


Irgacure 819

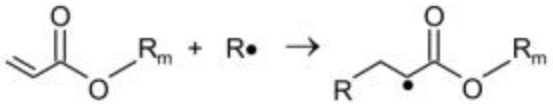


Reaction Schemes

Photodissociation



Double-bond addition of acrylates



Chemical formulae of the photoresist constituents