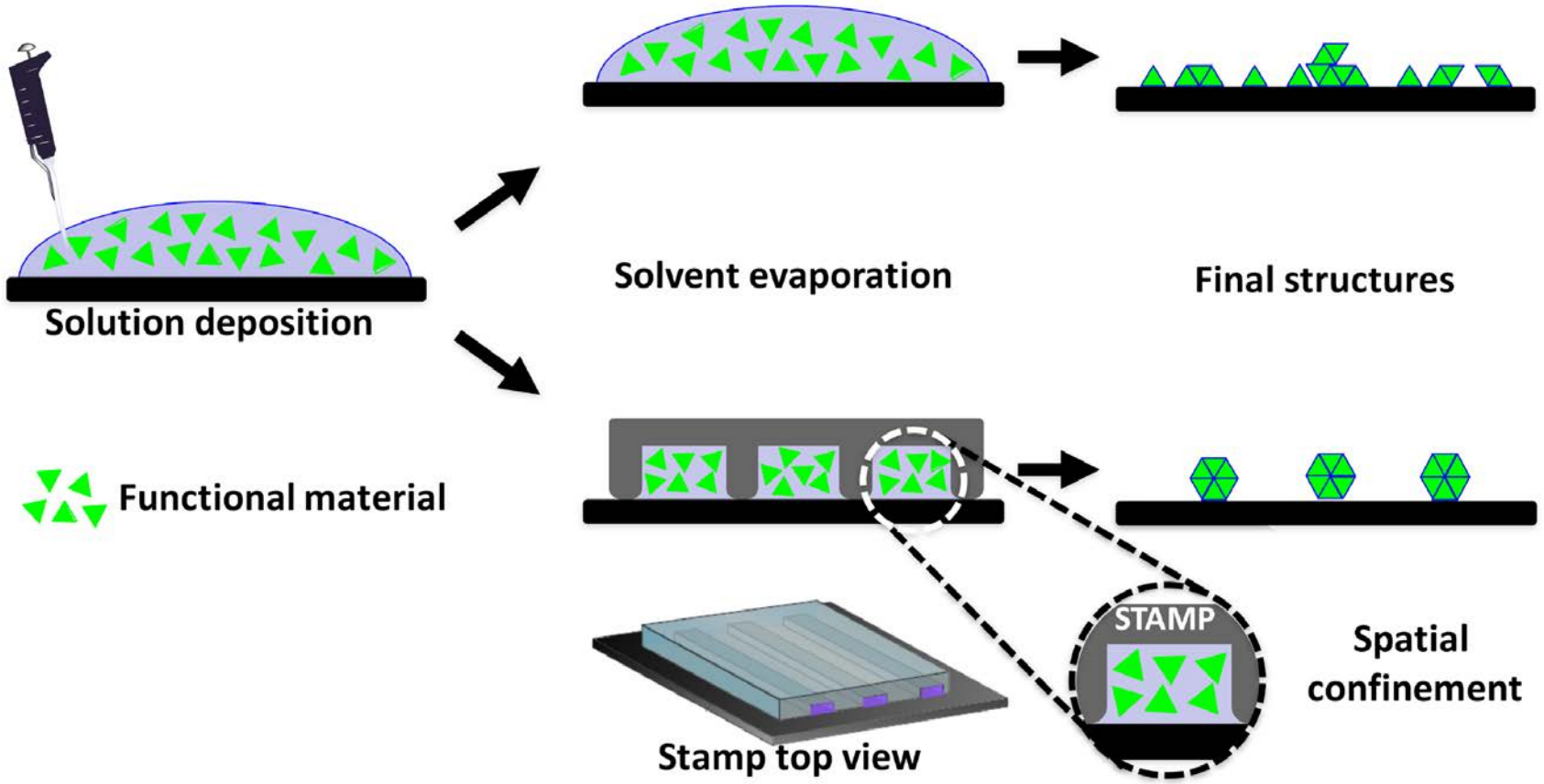
Self-organization in confinement: a strategy to exploit and improve the properties of functional materials

Denis Gentili
CNR-ISMN Bologna

Conferenza di Dipartimento

Alghero, 19-20 Ottobre 2017

Stamp-assisted confinement



Nat. Protoc. **2012**, *7*,1668.
Acc. Chem. Res. **2014**, *47*, 2692.

Materials Views
www.MaterialsViews.com

ADVANCED FUNCTIONAL MATERIALS
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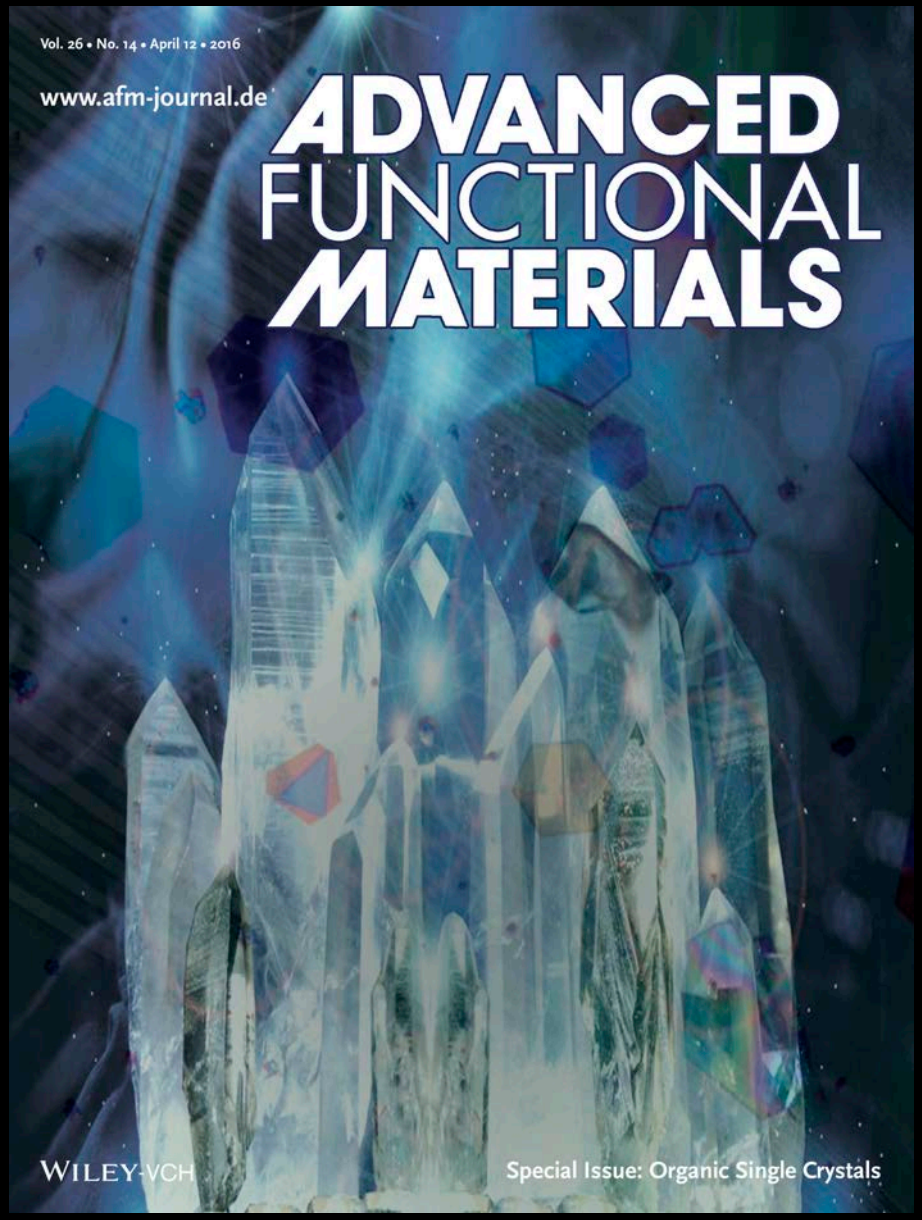
Growth and Manipulation of Organic Semiconductors Microcrystals by Wet Lithography

*Denis Gentili, Fabiola Liscio, Luigi Mariucci, Luca Beverina, Manuela Melucci, Stefano Toffanin, Silvia Milita, and Massimiliano Cavallini**

FULL PAPER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Special Issue: Organic Single Crystals

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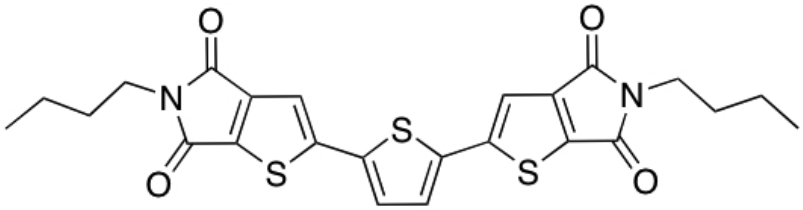
Functional materials



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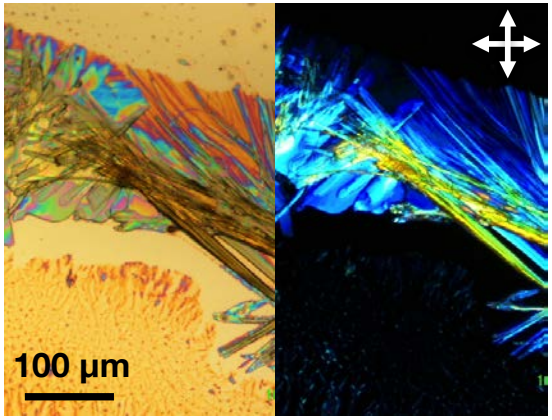
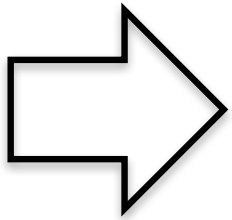
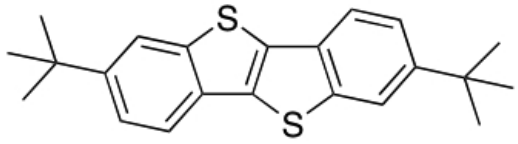
M. Melucci (CNR-ISOF)



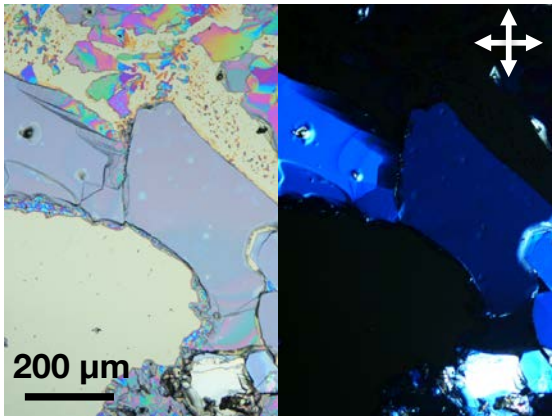
Drop casting



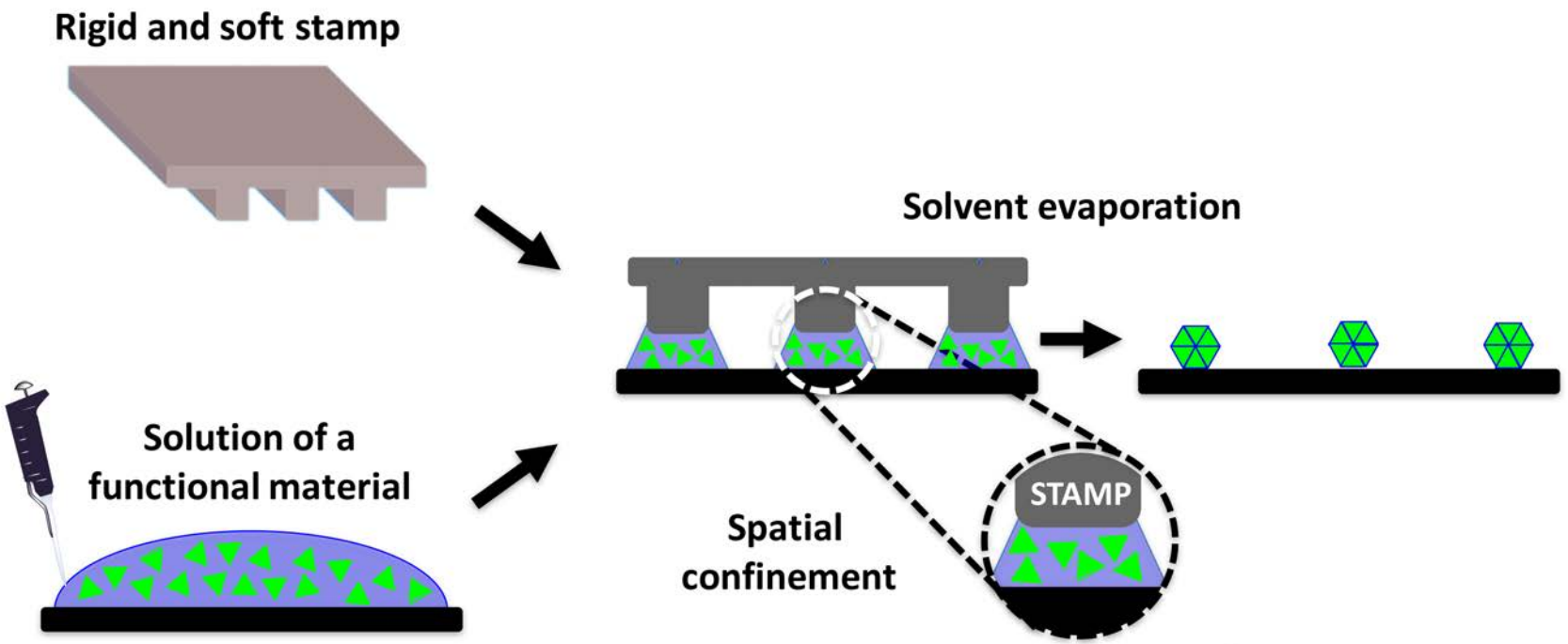
Random crystals



p-type
L. Beverina (UNIMIB)



Lithographically Controlled Wetting (LCW)



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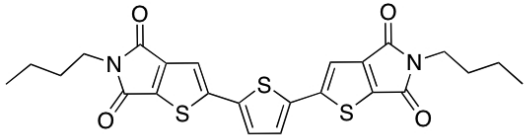
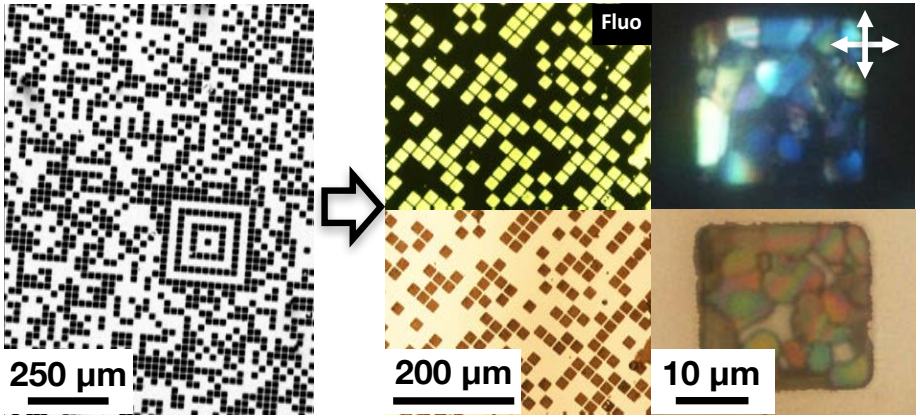
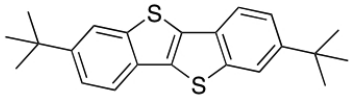
Results

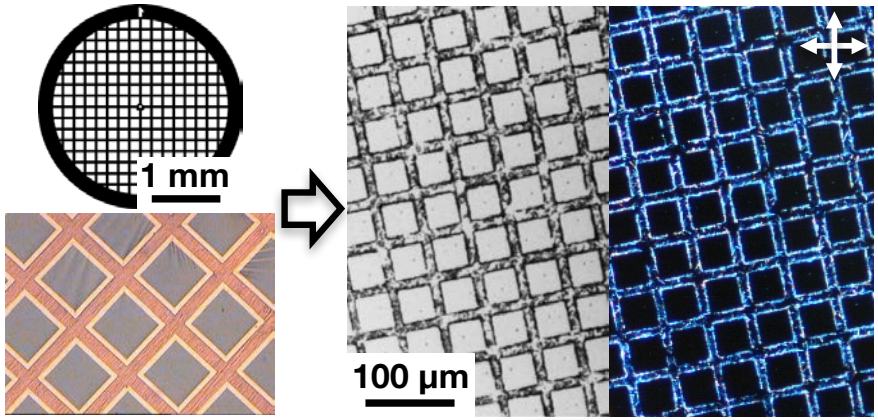
Soft stamp: 2D barcode



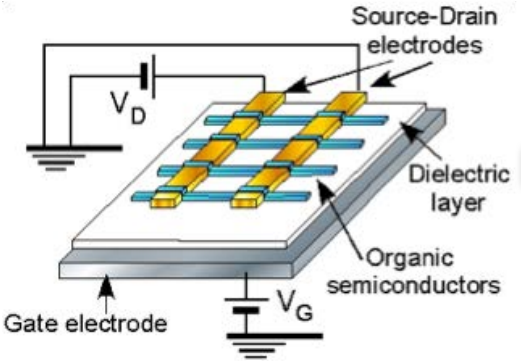


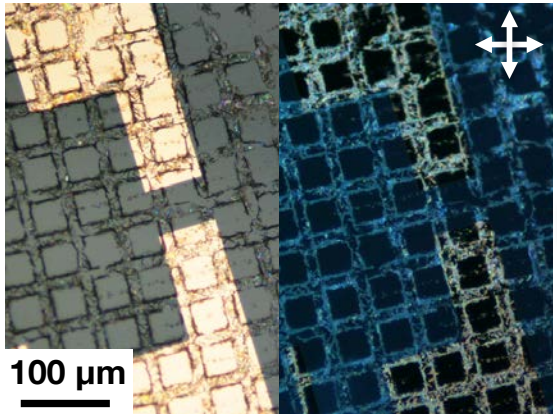
Rigid stamp: square grid

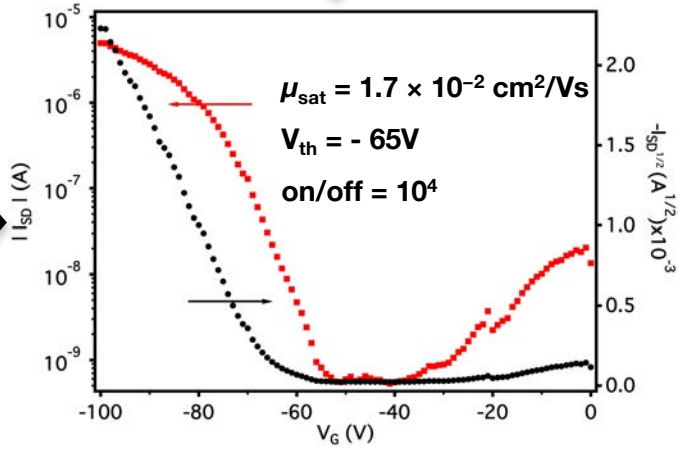




Organic field effect transistor







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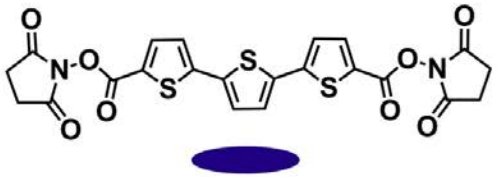
Additive, modular functionalization of reactive self-assembled monolayers: toward the fabrication of multilevel optical storage media†

Denis Gentili,‡[a] Marianna Barbalinardo,‡[a] Ilse Manet,[b] Margherita Durso,[b] Marco Brucale,[a] Alessio Mezzi,[a] Manuela Melucci[b] and Massimiliano Cavallini*[a,c]

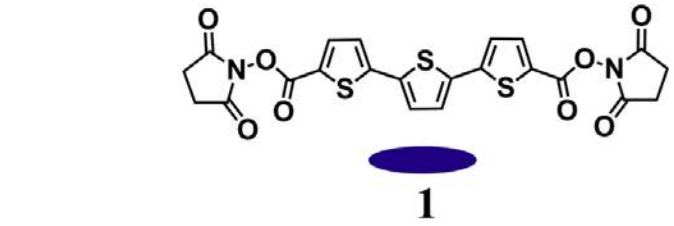
Functional materials

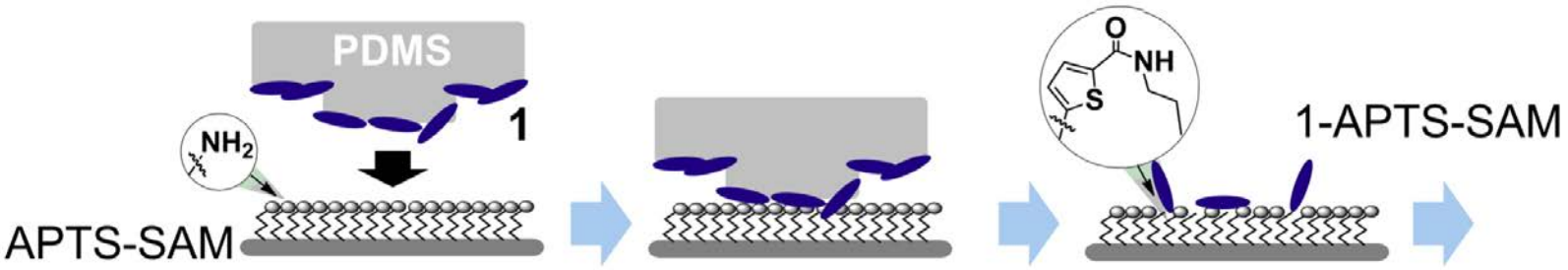


1

in collaboration with M. Melucci (CNR-ISOF)

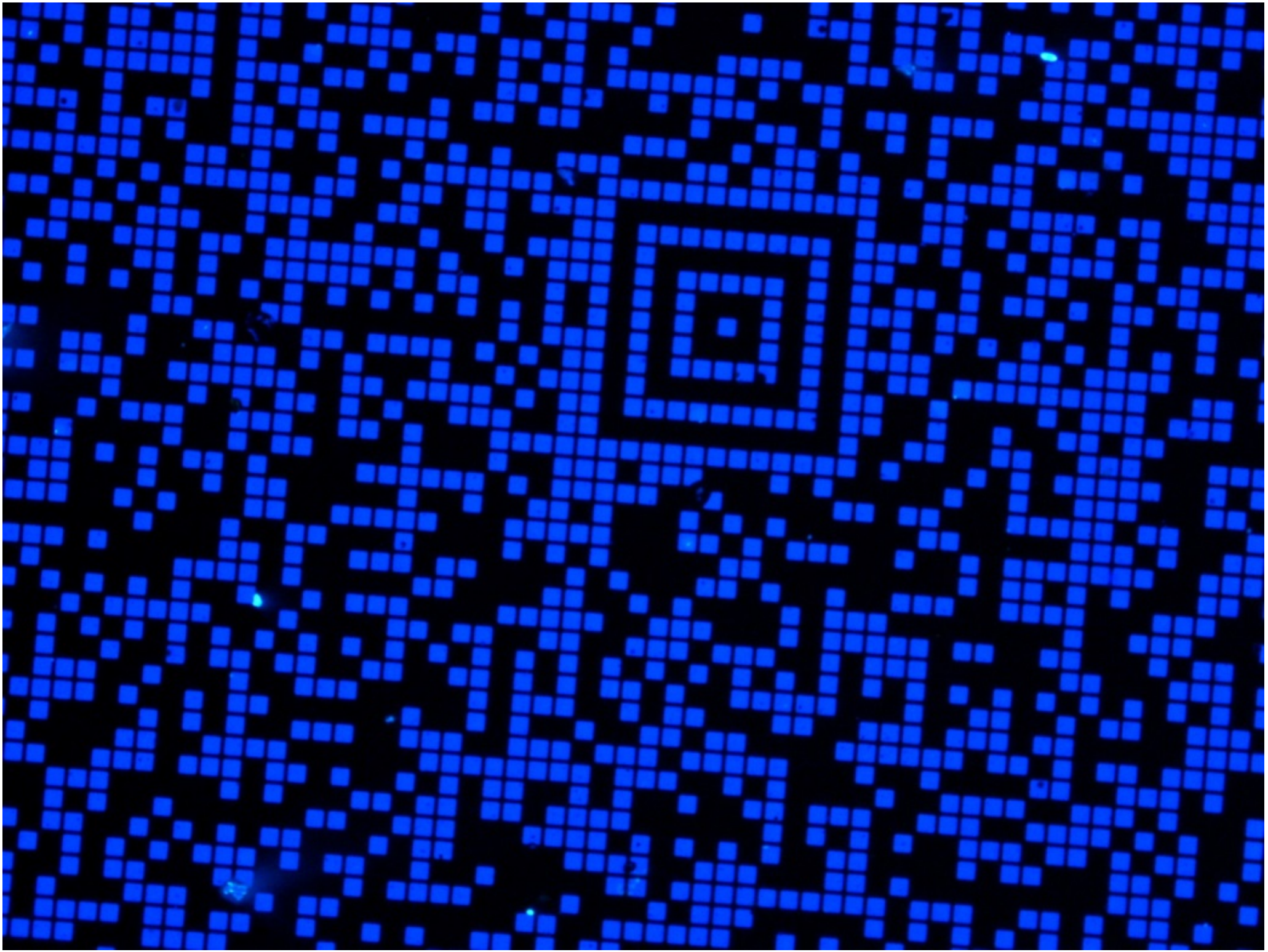
Strategy





Microcontact Printing (µCP)

in collaboration with M. Melucci (CNR-ISOF)



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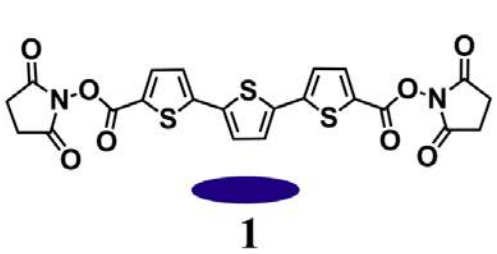
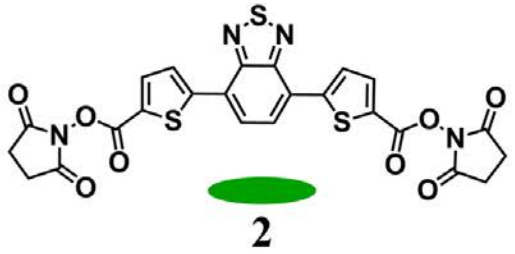
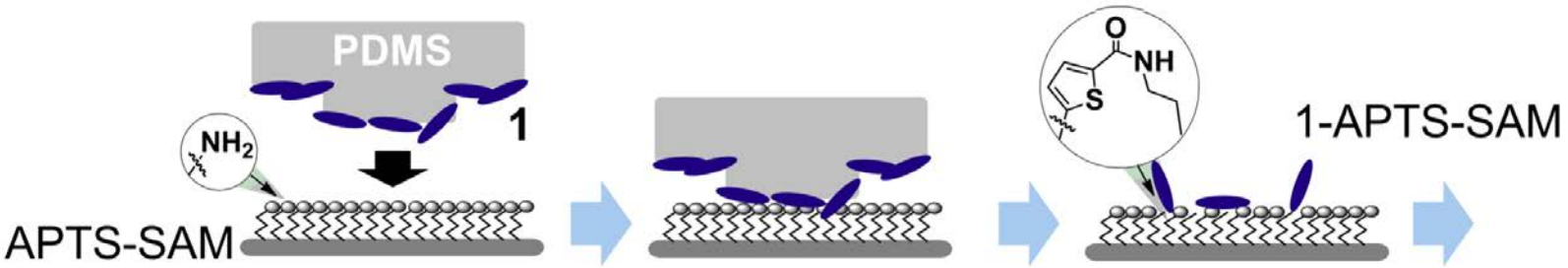
Strategy







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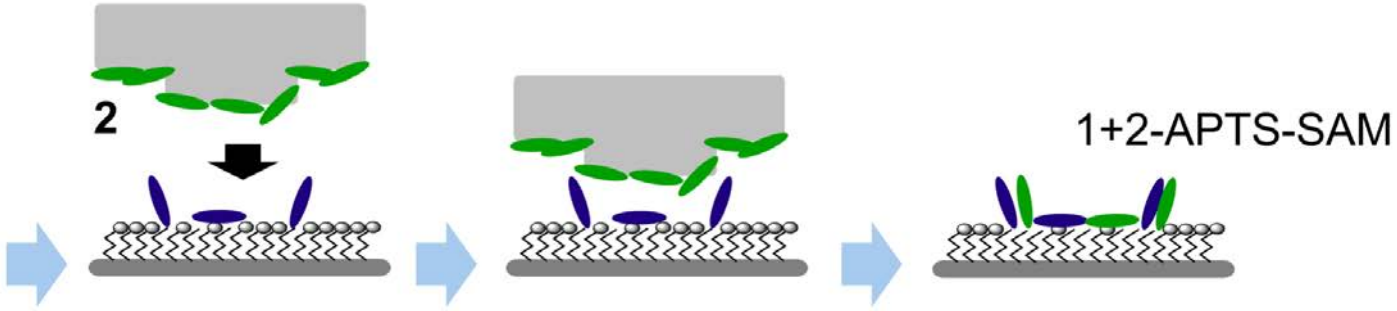

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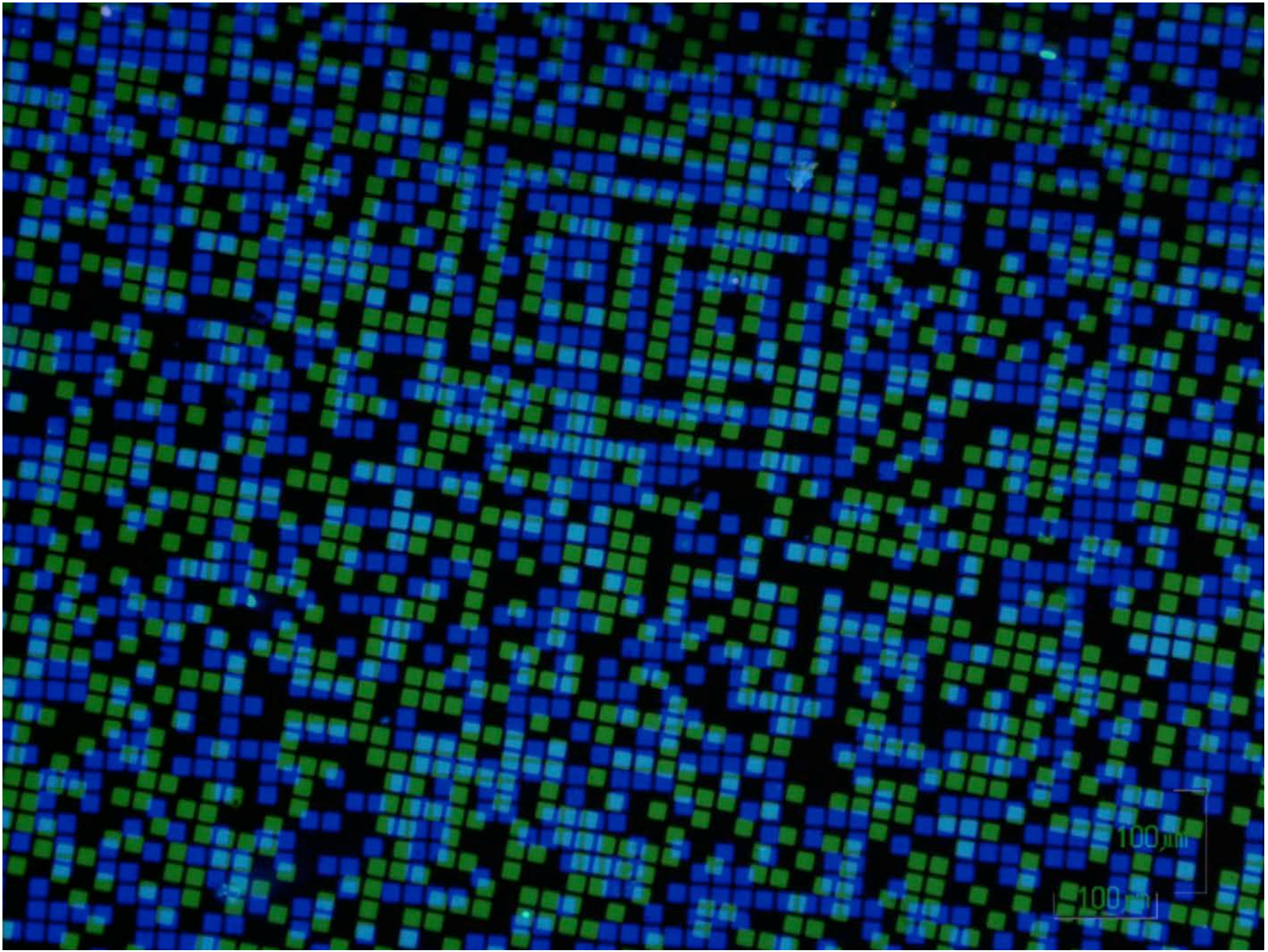
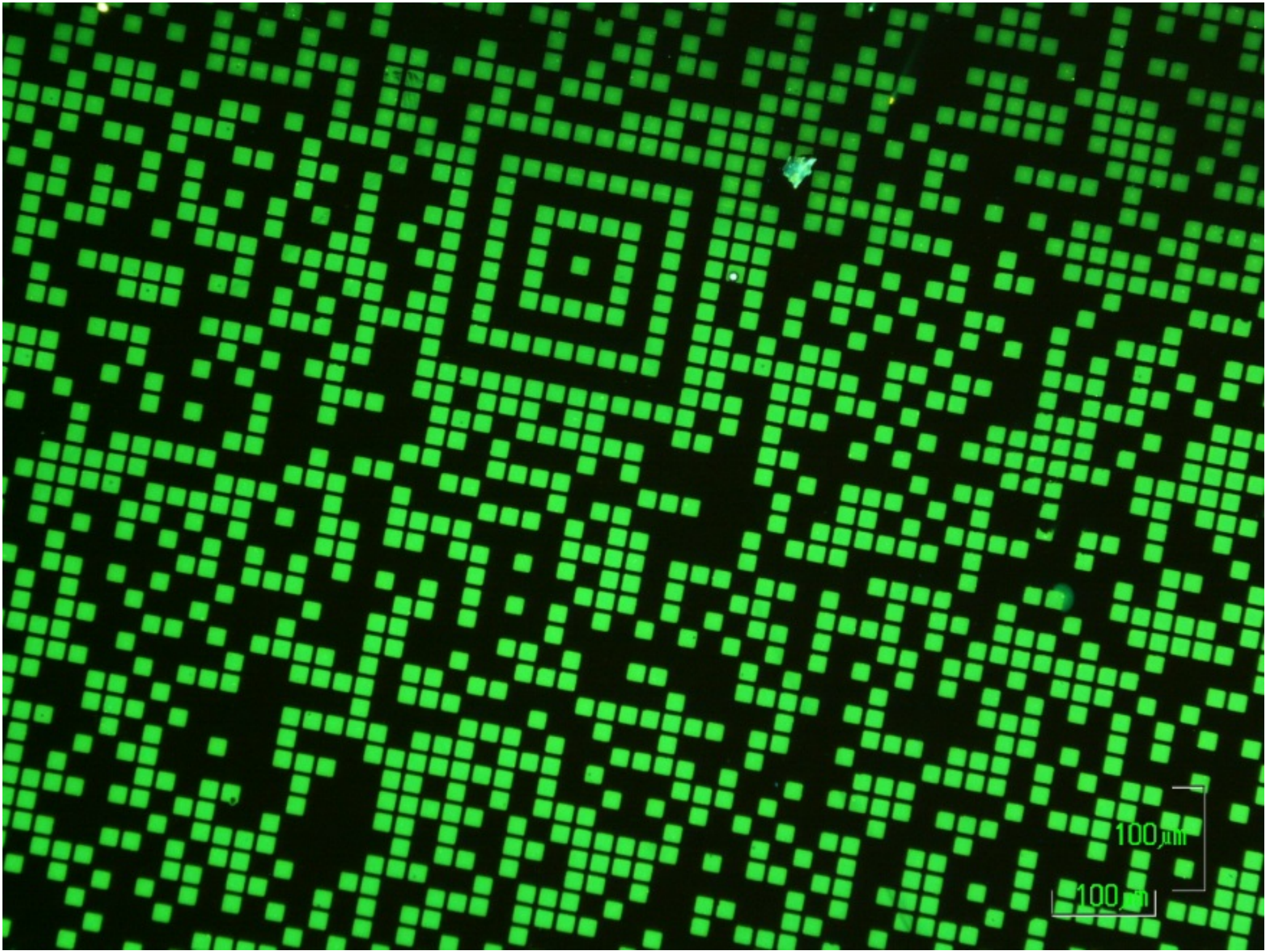
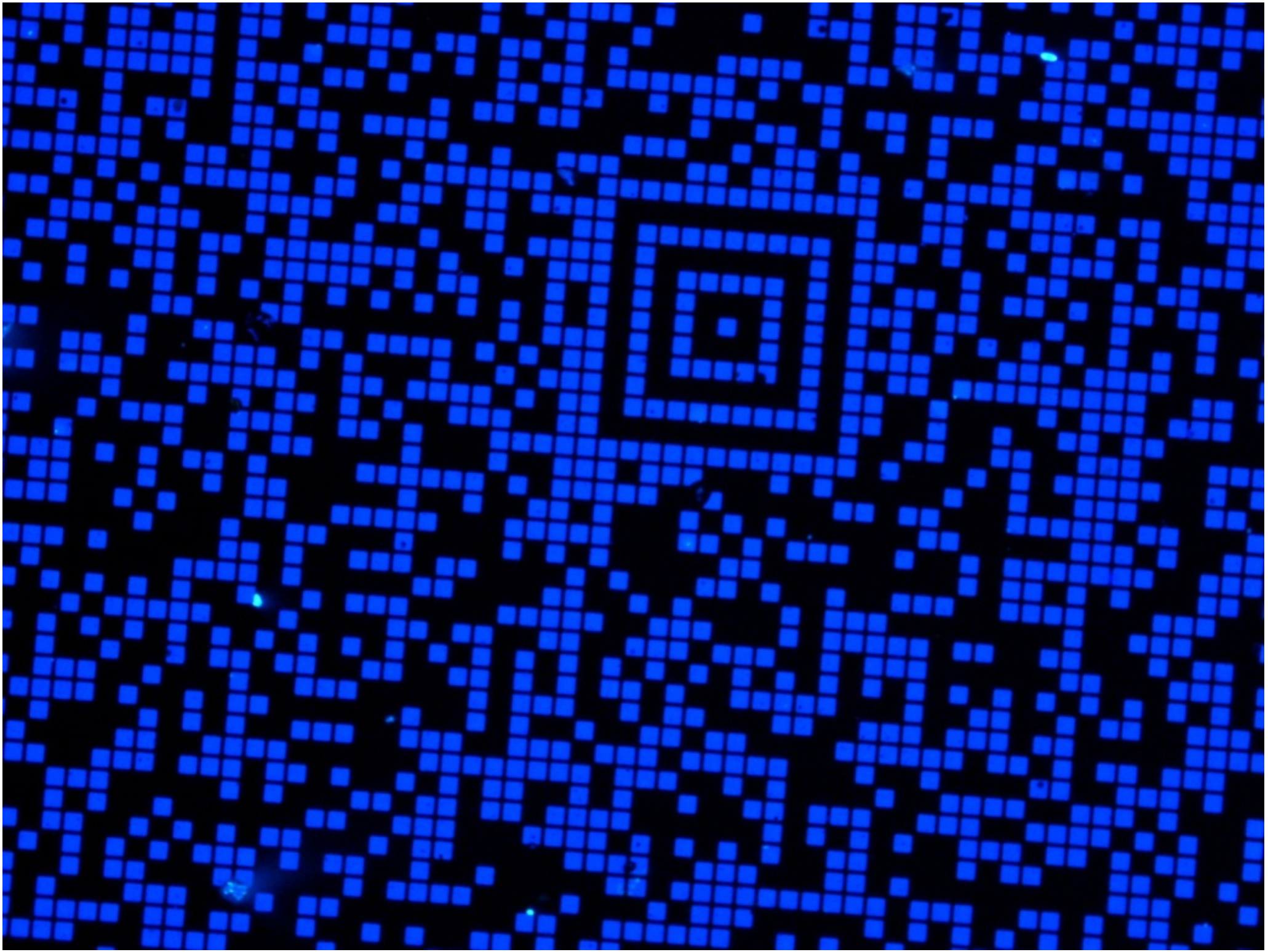

100 µm
100 µm


100 µm
100 µm



Journal of
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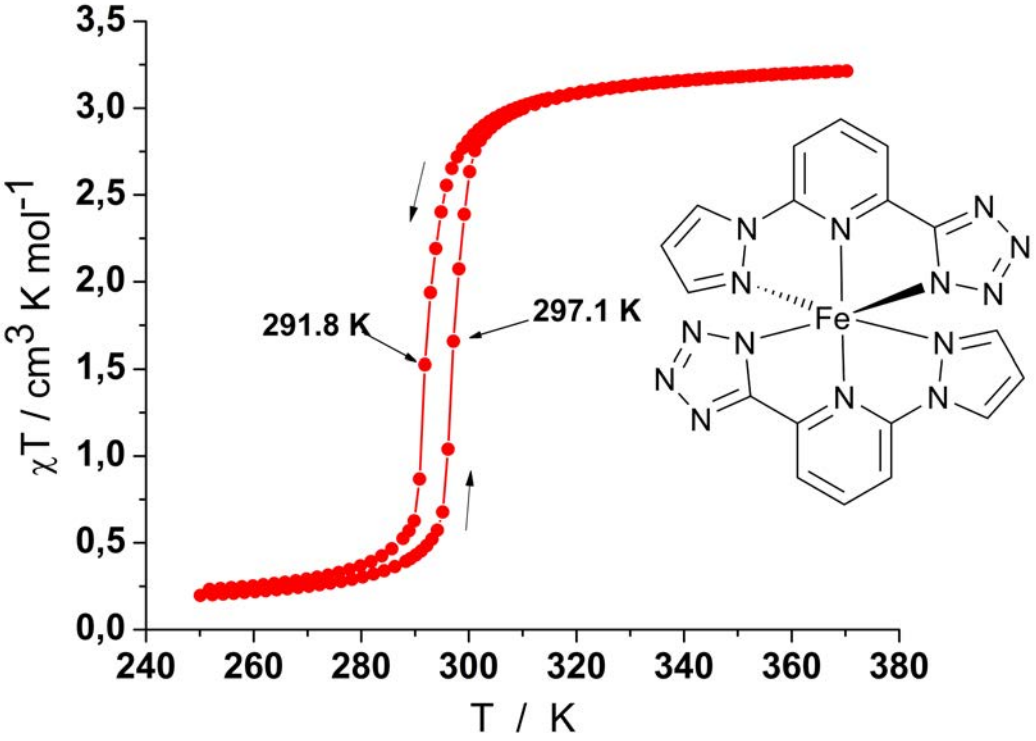
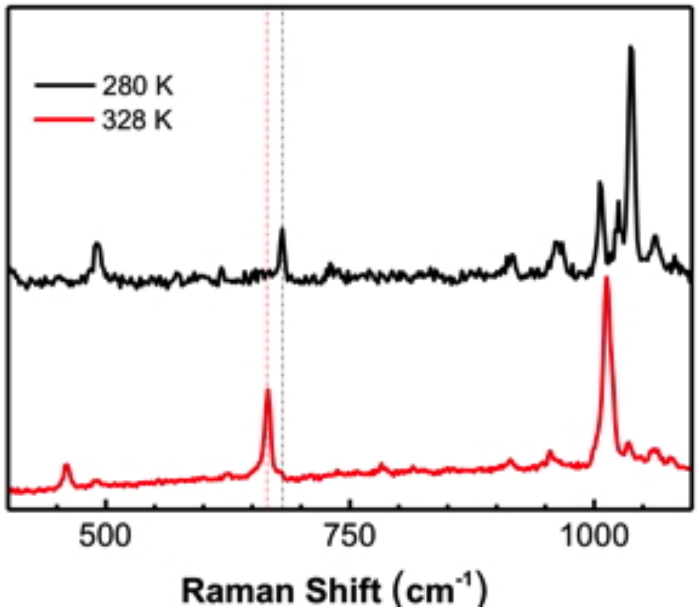
Multi-modal sensing in spin crossover compounds†

Denis Gentili,‡[a] Nicola Demitri,‡[b] Bernhard Schäfer,[c] Fabiola Liscio,[d] Ilaria Bergenti,[a] Giampiero Ruani,[a] Mario Ruben[ce] and Massimiliano Cavallini*[af]





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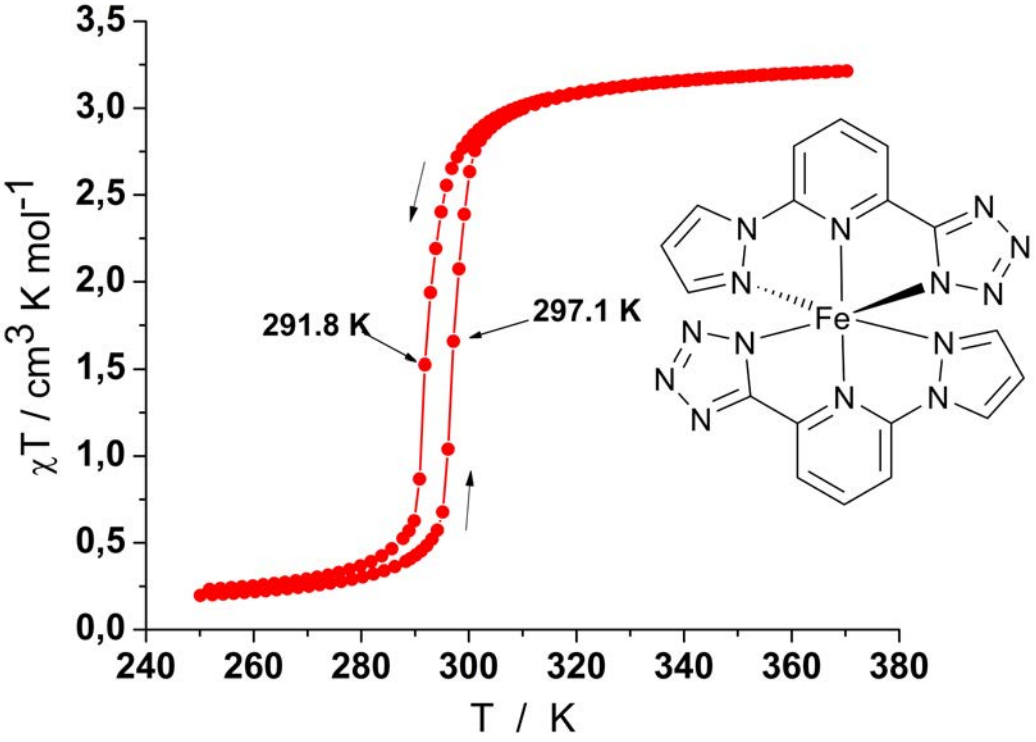

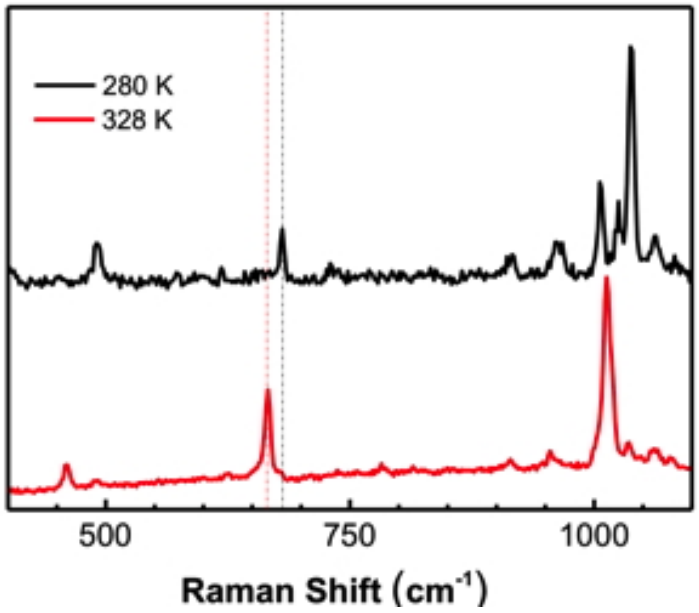

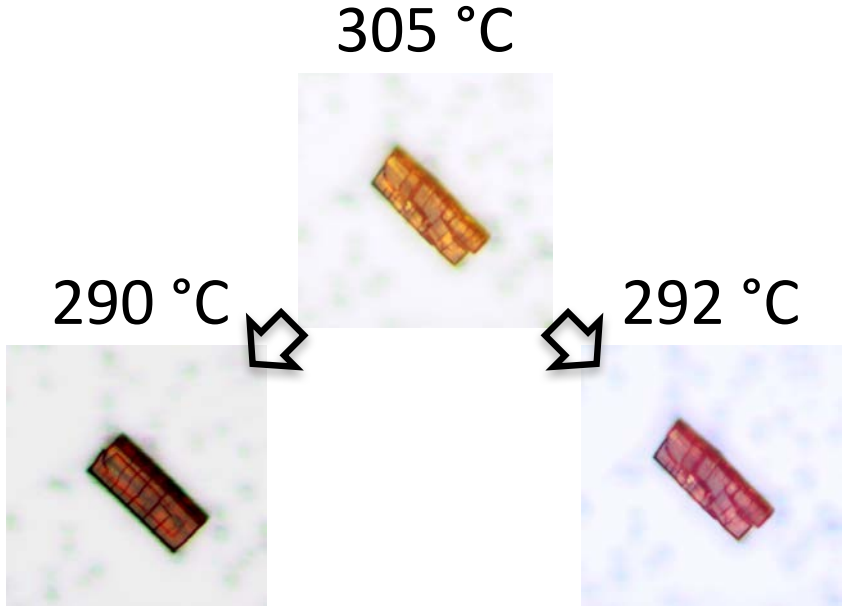

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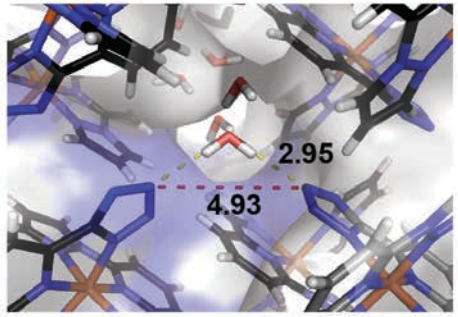
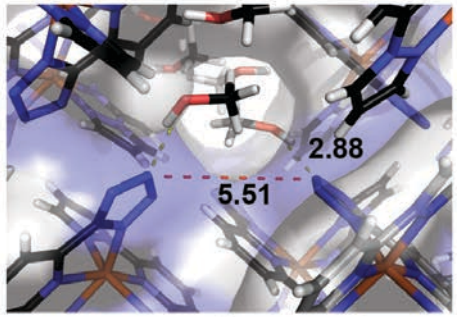
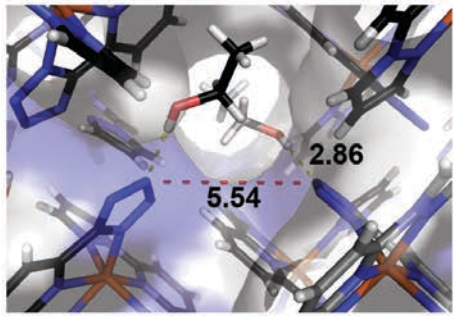


air



methanol



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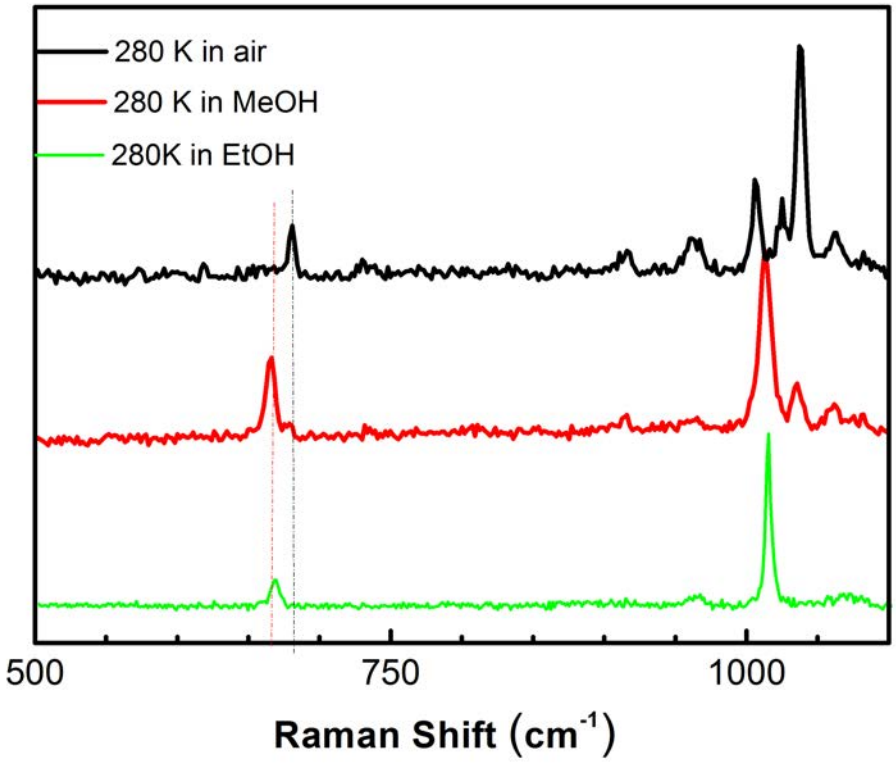

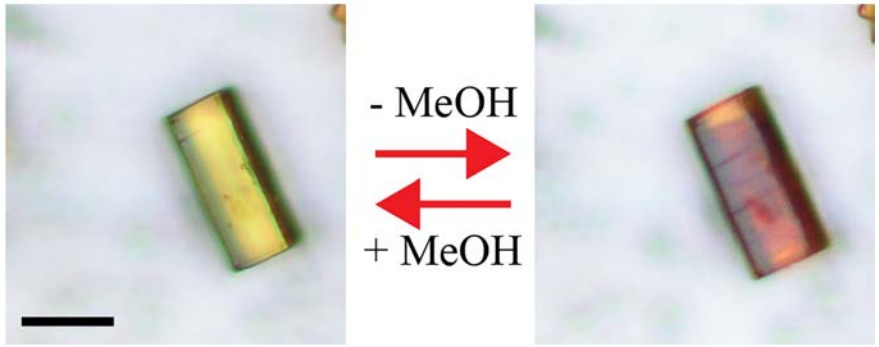

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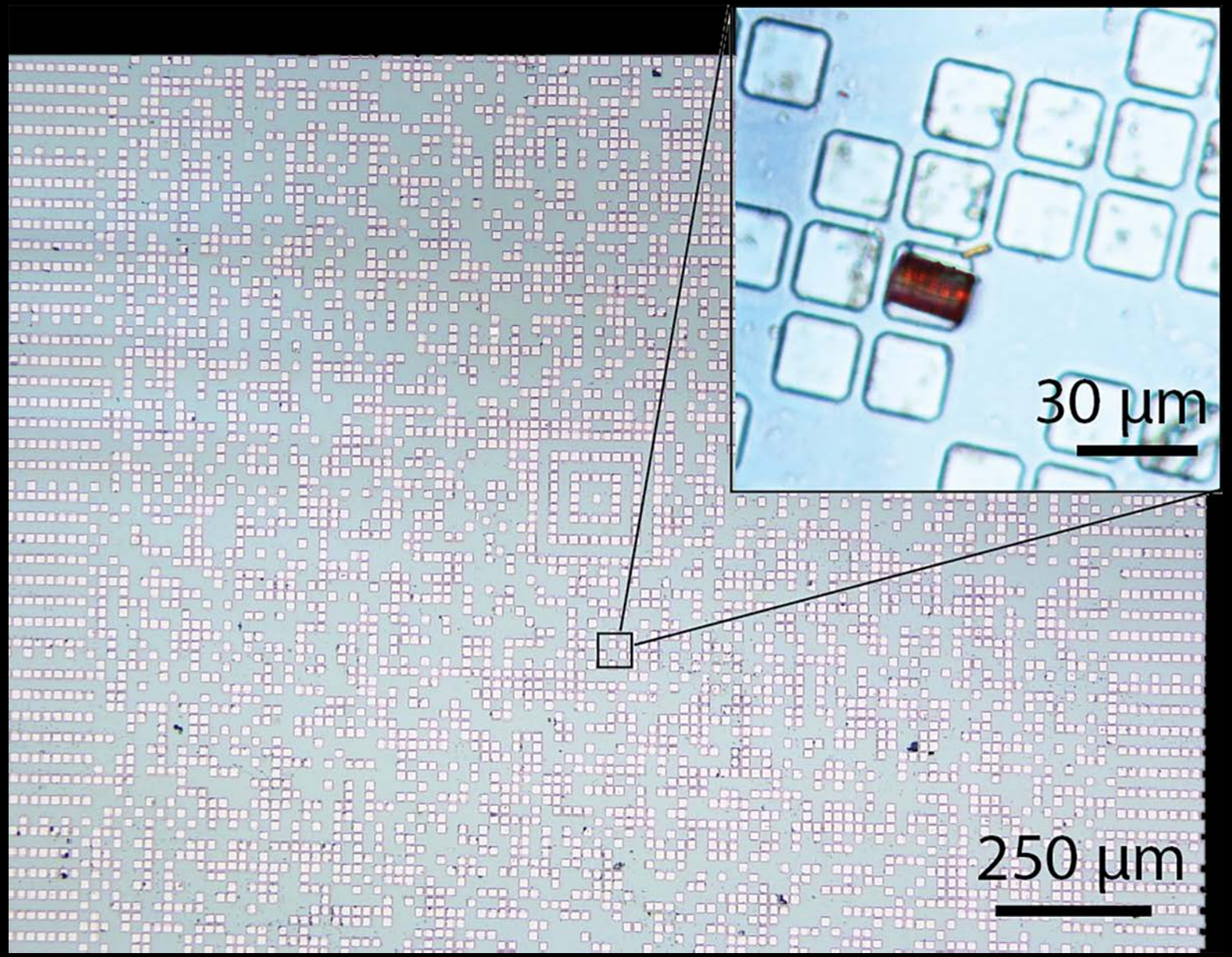
30 µm
250 µm

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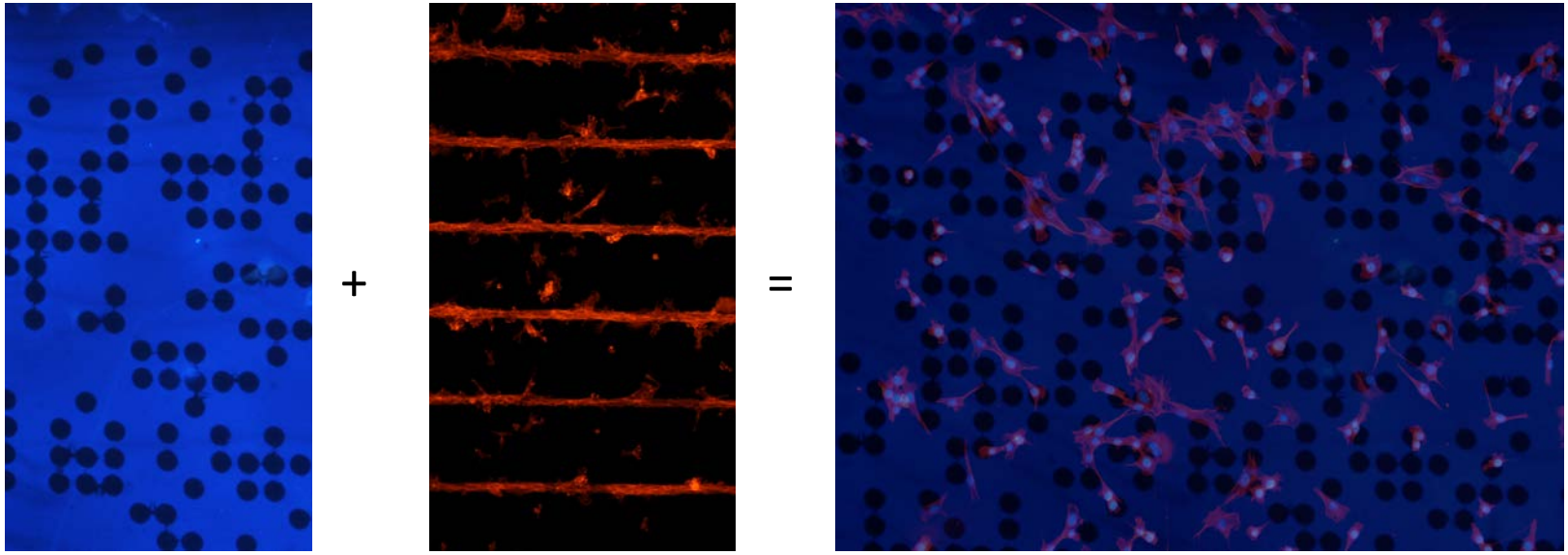
Perspective: new applications

Combination of functional materials for new applications

Cells on fluorescent data-matrix



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Conclusions

Effects of stamp-assisted spatial confinement:

- Control over position, density, orientation, and size of micro and nanostructures
- Exploit the properties of functional materials for the fabrication of devices
- Expand the materials target to unexpected applications

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Acknowledgments

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Dr. Alessio Mezzi

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Dr.ssa Emanuela Saracino

Elettra-Sincrotrone

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Dr. Luigi Mariucci

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