

# Investigation of the biocompatibility of SURMOFs as cell adhesive substrate coatings

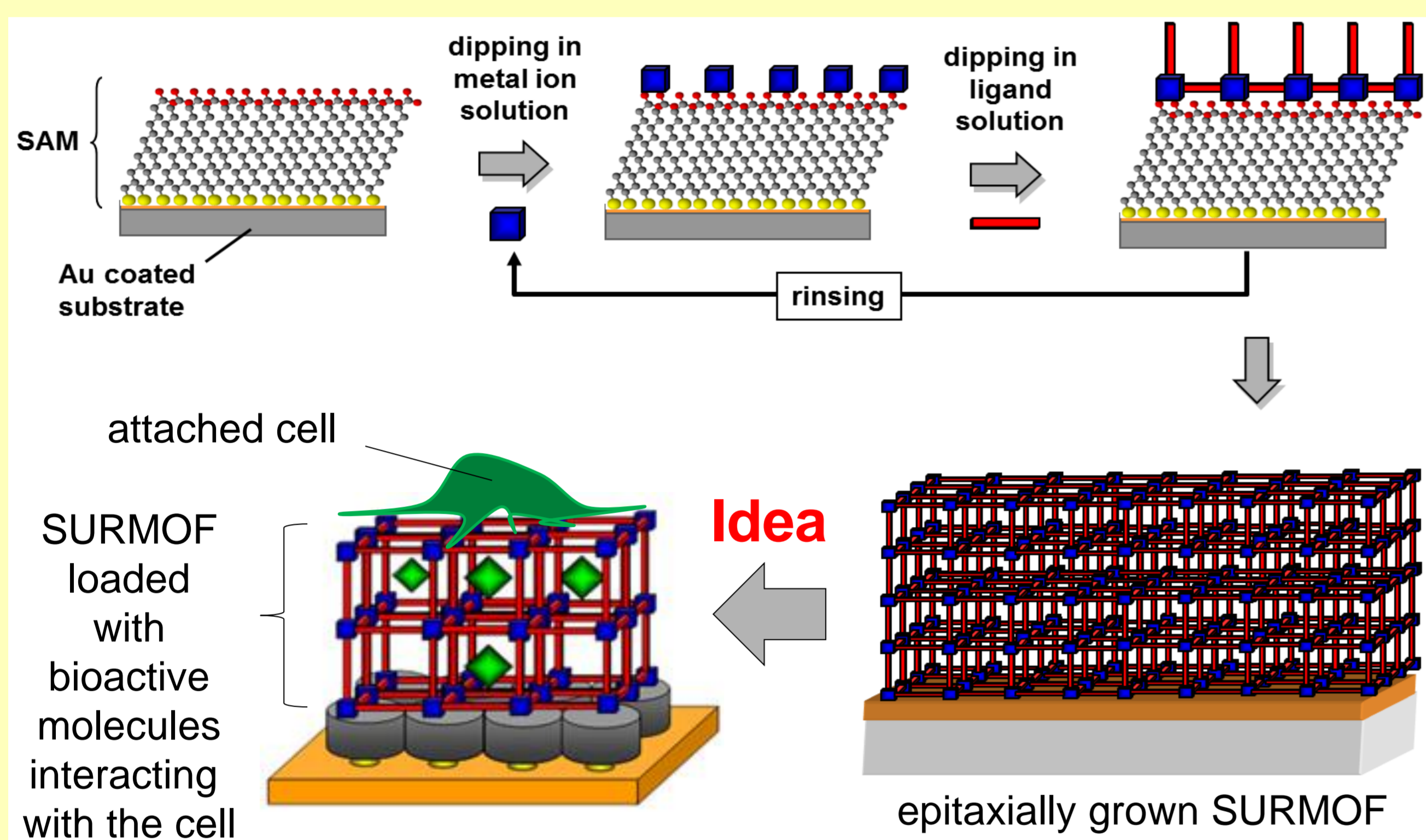
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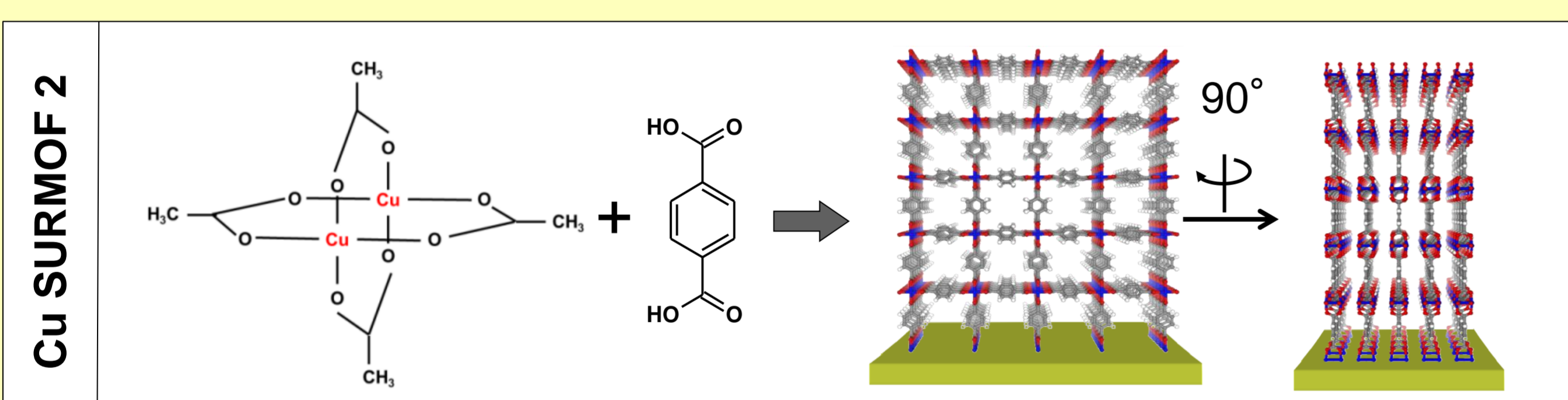
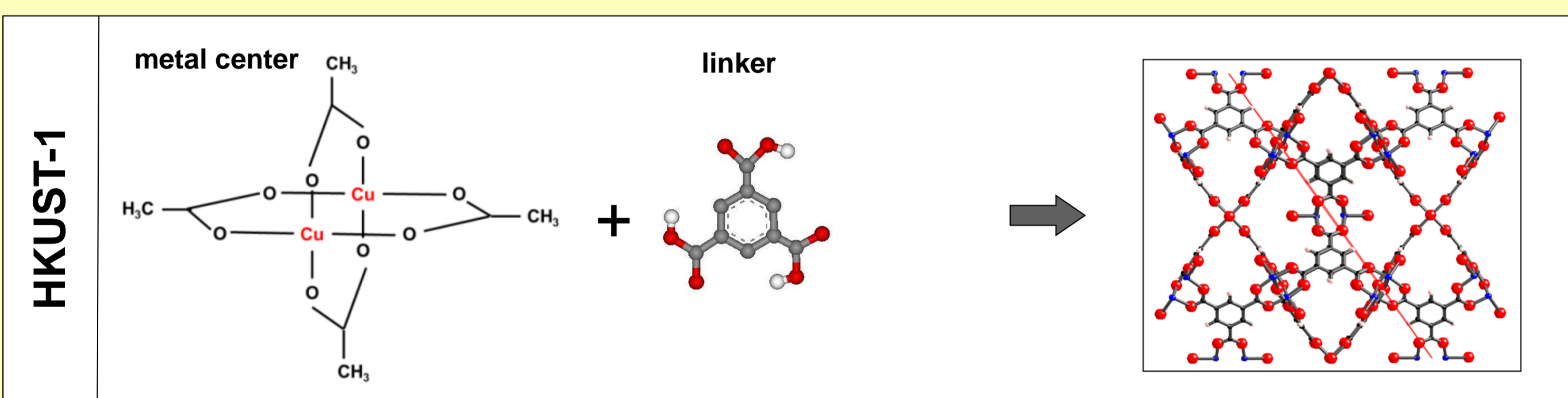
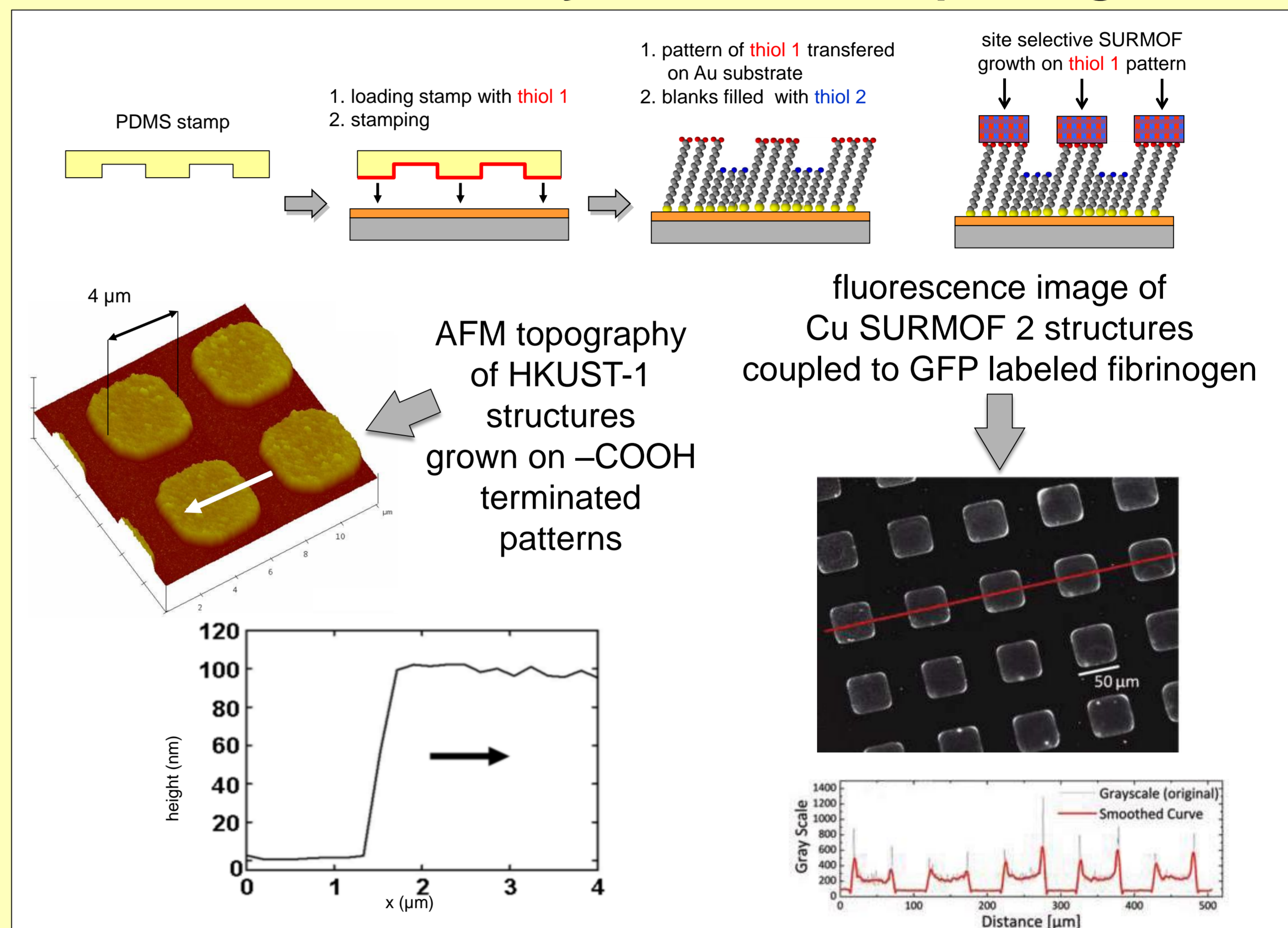
## Introduction and future challenges

Self assembled monolayer (SAM) based, surface-anchored metal-organic frameworks (**SURMOFs**) are a new class of highly porous material which have high potential for biological application e.g. to store and to release diverse (bio-) molecules and as deposition sites for cells in aqueous environment. Therefore, one challenge will be the preparation of water stable SURMOFs. Here the stability of different SURMOFs against water and different media used in micro and cell biology is investigated as well as the interaction between site selective deposited SURMOF structures with fibroblasts.

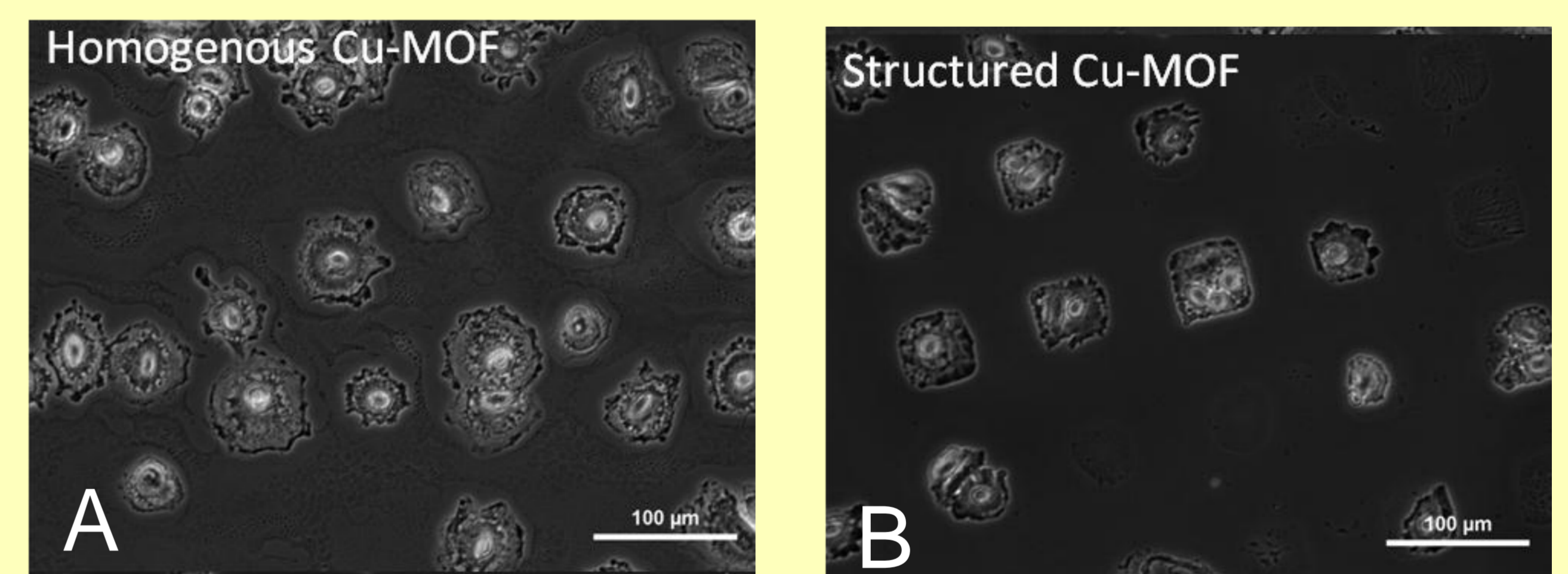
## Layer-by-Layer (LBL) deposition of SURMOFs on thiol SAM functionalized Au coated substrates [1,2]



## Structured SURMOFs by micro contact printing [3,4]

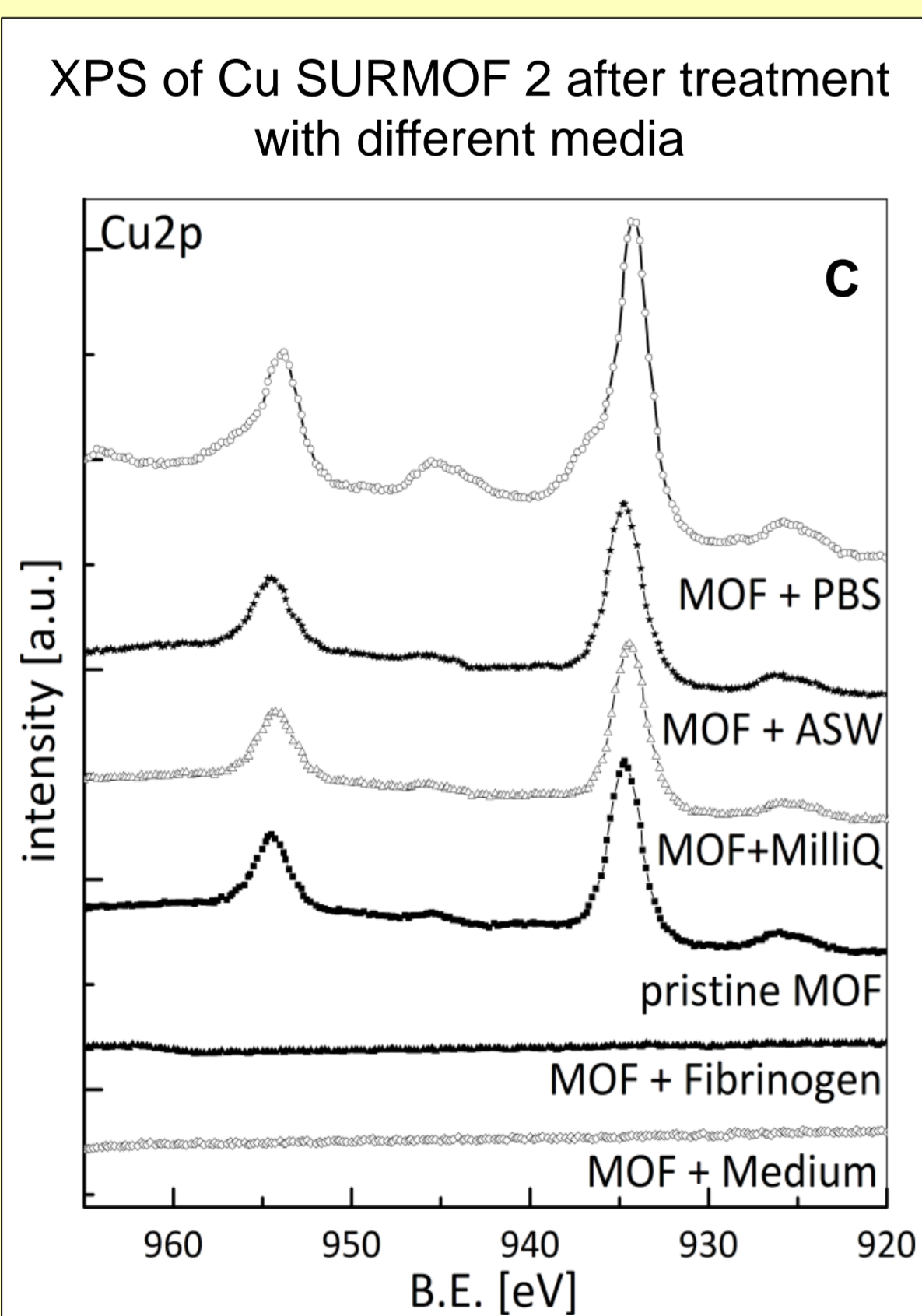


## Interaction of Ref52WT with Cu SURMOF 2 [4]



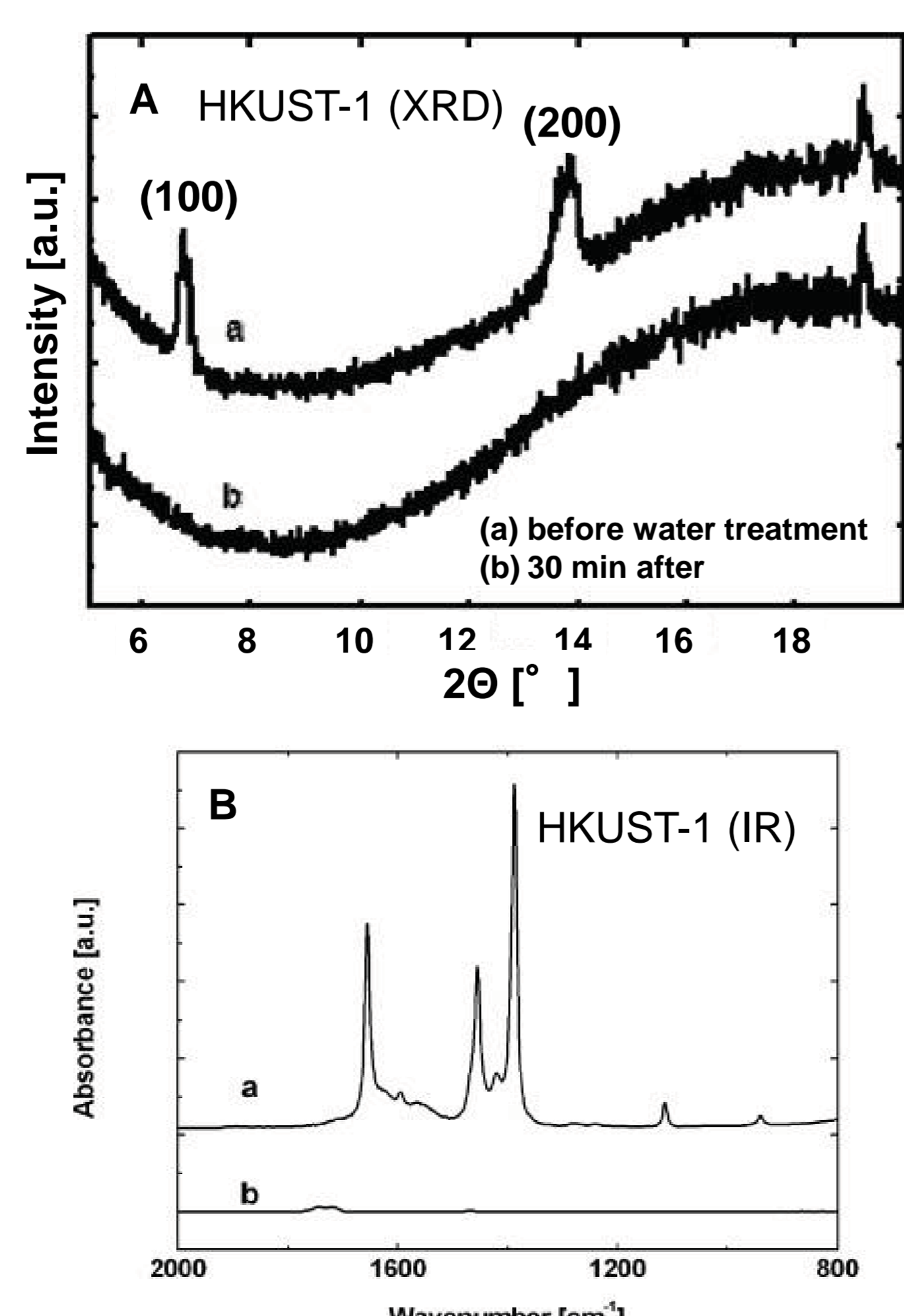
- SURMOF instable in cell medium
- released Cu ions do not harm the cells or delay their adsorption and proliferation

## Water stability of SURMOFs [4]

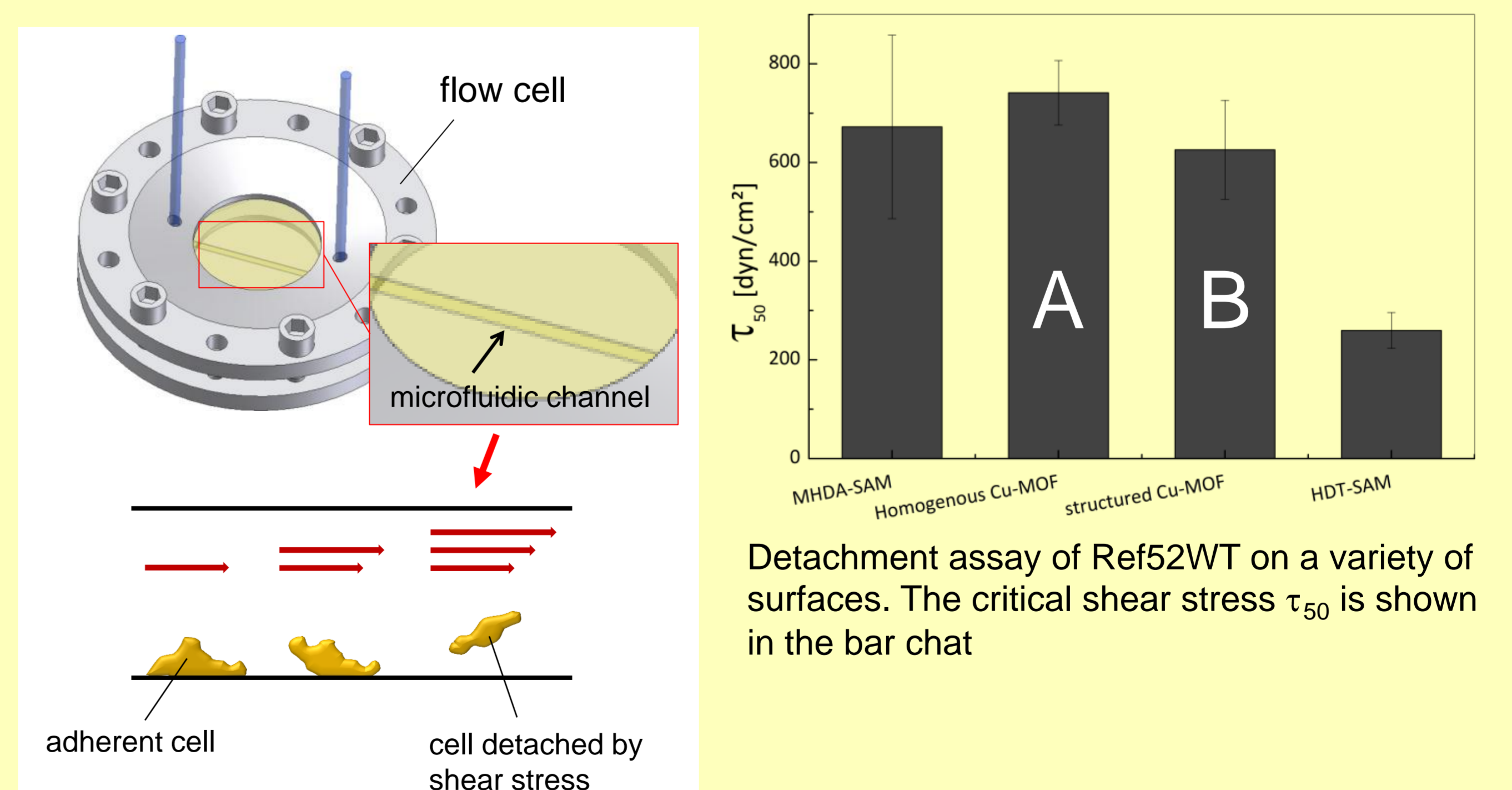


- HKUST-1 instable in water
- Cu SURMOF 2 stable in water and artificial sea water (ASW) / instable in protein containing media / in PBS degradation to an amorphous mass

XRD and IR results of HKUST-1 before (a) and 30 min after (b) treatment with water



## Cell detachment by hydrodynamic shear flow [4,5]



- [1] O. Shekhah, H. Wang, S. Kowarik, F. Schreiber, M. Paulus, M. Tolan, C. Sternemann, F. Evers, D. Zacher, R. A. Fischer, C. Wöll, *J. Am. Chem. Soc.* **2007**, *129*, 15118
- [2] H. Gliemann, C. Wöll, *Materials Today* **2012**, *15*, 110
- [3] M. Darbandi, H. K. Arslan, O. Shekhah, A. Bashir, A. Birkner, C. Wöll, *Phys. Status Solidi RRL*, **2010**, *4*, 197
- [4] M. Hanke, H. Arslan, S. Bauer, O. Zybaylo, C. Christophis, H. Gliemann, A. Rosenhahn, C. Wöll, *Langmuir* **2012**, *28*, 6877-6884
- [5] C. Christophis, M. Grunze, A. Rosenhahn, *Phys. Chem. Chem. Phys.* **2010**, *12*, 4498.