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Hydrophobic Forces in Liquid Selfassembly

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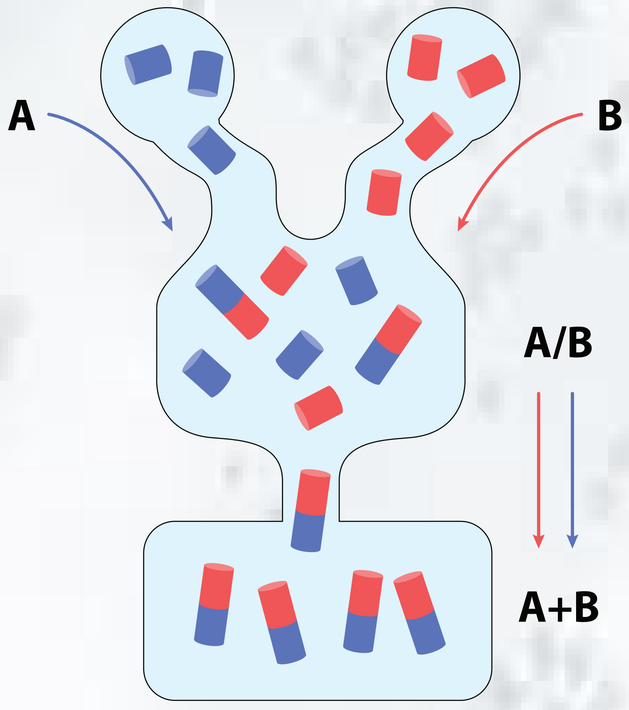
ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

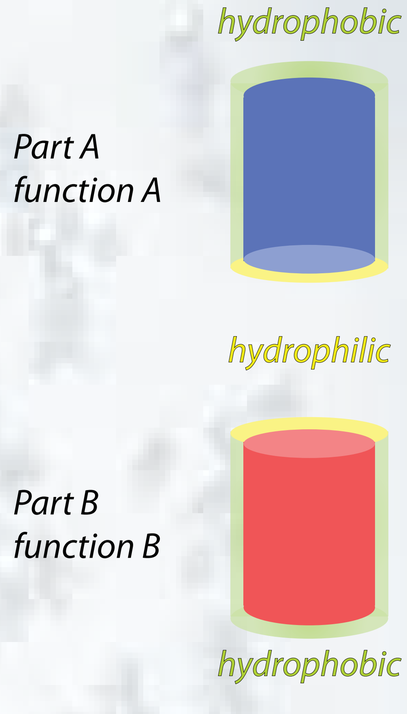


Objective

Liquid mediated selfassembly of different functional parts assisted by...

... a microfluidic system
(i) delivery of parts into
(ii) reaction chamber and
(iii) selection

... orthogonal functionalisation
(i) hydrophilic
(ii) hydrophobic

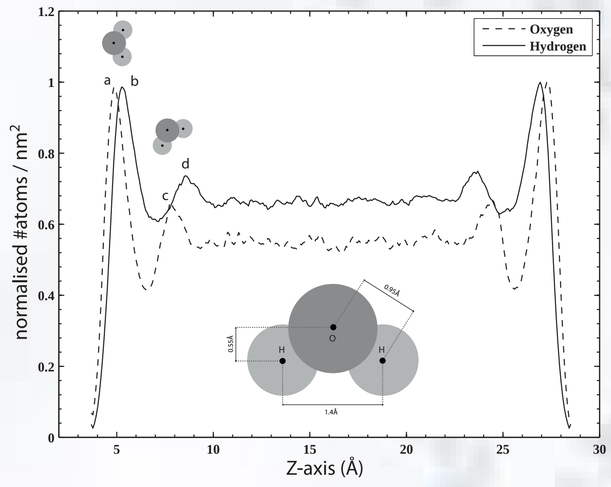


Parts

... have different functions like
(i) sensor
(ii) actuator
(iii) transmitter

... are orthogonally functionalised by

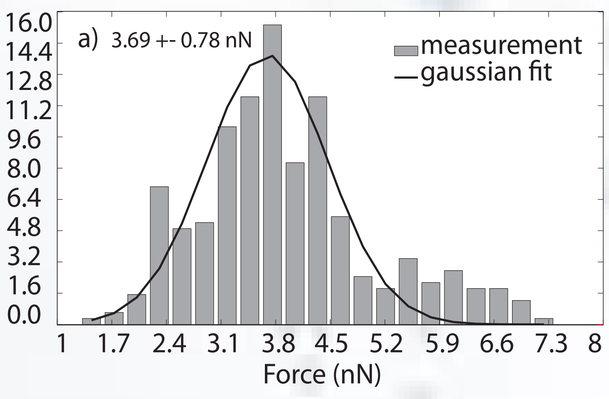
... carbon
... teflon (C_4F_8)
... thiols
... plasma O_2 treatment

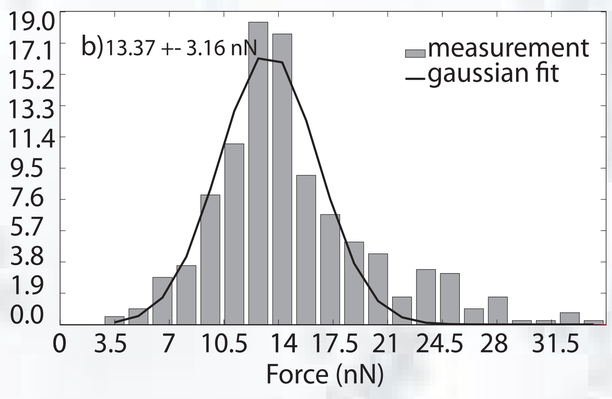


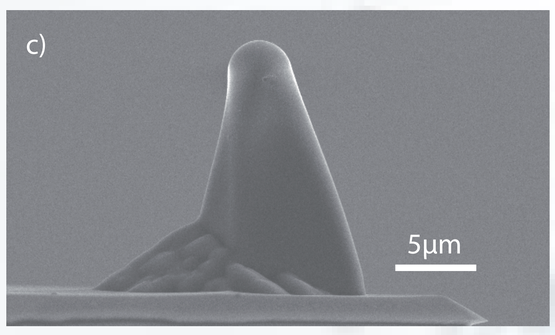
Hydrophobic Interaction

has been investigated by

... molecular dynamic simulations
(i) molecular layering
(ii) orientation of molecules
(iii) interaction length





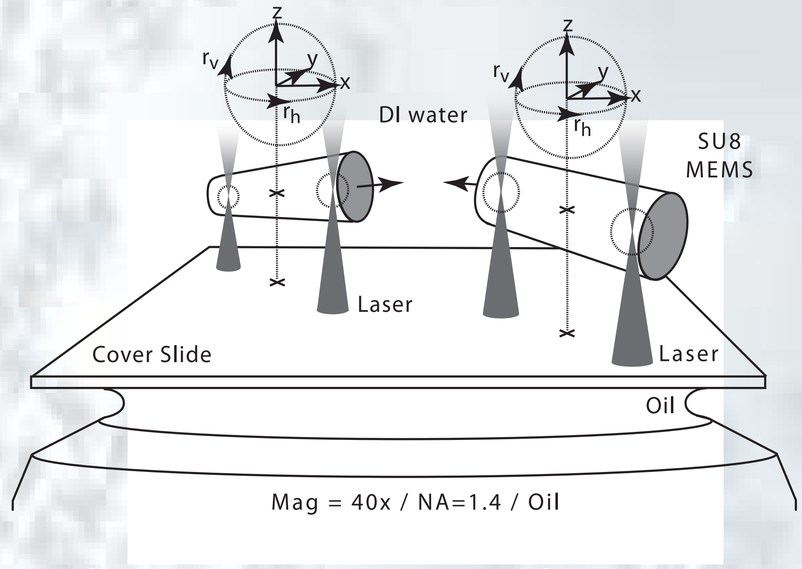


... force measurement histograms on hydrophobic surfaces by scanning probe microscopy
(a) teflon-teflon
(b) carbon-carbon
(c) SEM of used probe tip

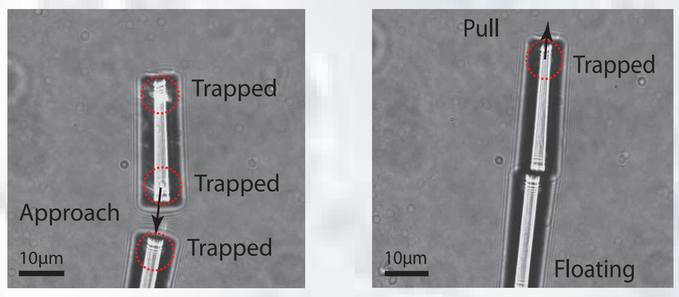
R. M. Gullo, L. Jacot-Descombes, L. Aeschimann and J. Brugger, "Characterization of Hydrophobic Forces for in Liquid Self-Assembly of Micron-Sized Functional Building Blocks", ***Materials Research Society Symopsium Proceedings***, Boston, Massachusetts, USA, November 30-December 2, 2010..

Optical Trapping

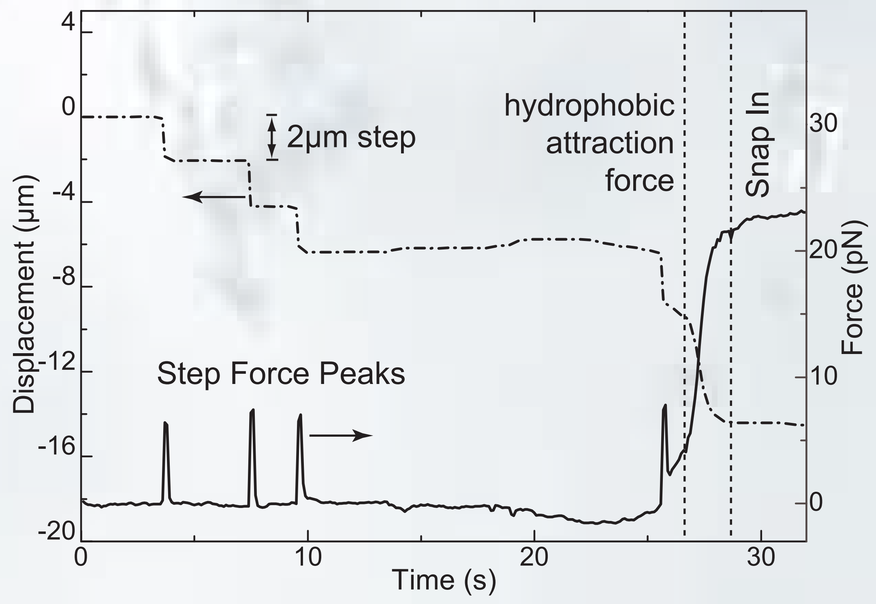
... allows manipulating MEMS in 3D



... allows aligning and assembling MEMS



... allows measuring the hydrophobic interaction directly on the MEMS



Background image
Optical image of in liquid pairwise selfassembled SU8 parts functionalised by local plasma O_2 surface treatment ***(by L. Jacot-Descombes)***

Acknowledgements

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