MICROFLUIDIC DEVICES FABRICATED USING SOFT LITHOGRAPHY FOR THE STUDY OF PROTEIN STRUCTURES USING SYNCHROTRON RADIATION CIRCULAR DICHROISM

J. Charmet[a,b], C. Bortolini[a,c], T. Kartanas[a], D. Copic[a], I. Condado Morales[a], Y. Zhang[a], P. K. Challa[a], T. Jávorf[d], R. Hussain[d], G. Siligardi[d] and T. P. J. Knowles[a]

[a]University of Cambridge (UK), [b]University of Warwick (UK), [c]Aarhus University (DK), [d]Diamond Light Source (UK).

Protein misfolding and aggregation diseases (including Alzheimer's and Parkinson's diseases) remain challenging to characterise in molecular detail due to a heterogeneous mixture of proteins and assemblies [1] resulting from their aggregation. Bulk characterisation techniques only account for the average characteristic of the mixture while single molecule techniques fail to report on the entire population.

The use of microfluidics to separate a heterogeneous mixture into time-resolved fraction combined with a bulk measurement technique such as SCRD opens up promising alternative avenues. However, due to the strong absorption of many materials in the far-UV region, the fabrication of microfluidic devices has been limited to fused silica devices [2]. Here we will present two device architectures, fabricated using conventional PDMS-based soft-lithography, compatible with SRCD.

[1] T. P. J. Knowles, M. Vendruscolo and C. M. Dobson, Nat. Rev. Mol. Cell Biol., 15, 384-396. 2014.
[2] A. S. Kane, et al., Anal. Chem., 80, 9534-9541, 2008.