	Experiment title: Abeta(1-42) and Abeta(25-35) fibrillation in presence and absence of a lipid membrane system and of a quasi contact-free substrate	**Experiment number**: SC3618
Beamline: ID21	**Date of experiment**: from: 27/2/2013 to: 1/3/2013	**Date of report**: 09/08/2013
Shifts: 6	**Local contact(s)**: Dr. Marine Cotte	*Received at ESRF:*

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Report:

We studied 5 different solutions related to β-amyloid fibrillation: Aβ(1-42), Aβ(1-42)+POPC/POPS, Aβ(25-35), Aβ(25-35)+POPC/POPS, POPC/POPS ((1-palmitoyl-2-oleoyl-phospatidylcholine); (1-palmitoyl-2-oleoyl-phospatidylserine). Aβ peptides and POPC/POPS lipids solutions in H_2O of, respectively, 1 mg/ml and 5 mg/ml were used for the experiments. We deposited droplets of about 4 µL by a micropipette on a superhydrophilic BaF_2 substrate obtained by plasma roughening of poly(methylmethacrylate) (PMMA). The droplets formed, after complete evaporation, a coffee-ring residual which allowed keeping the probed volume for the transmission experiments sufficiently low (Figure 1).

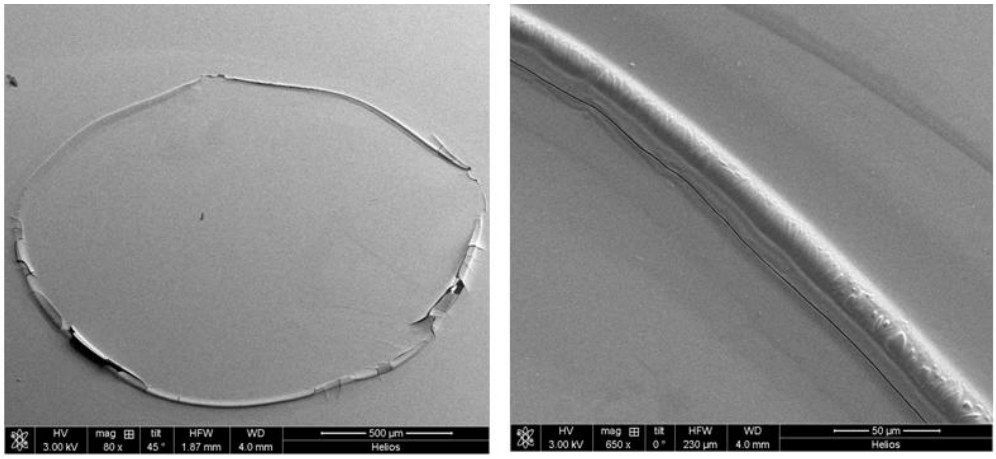

Figure 1. SEM pictures of Aβ(25–35) coffee-ringlinke residual

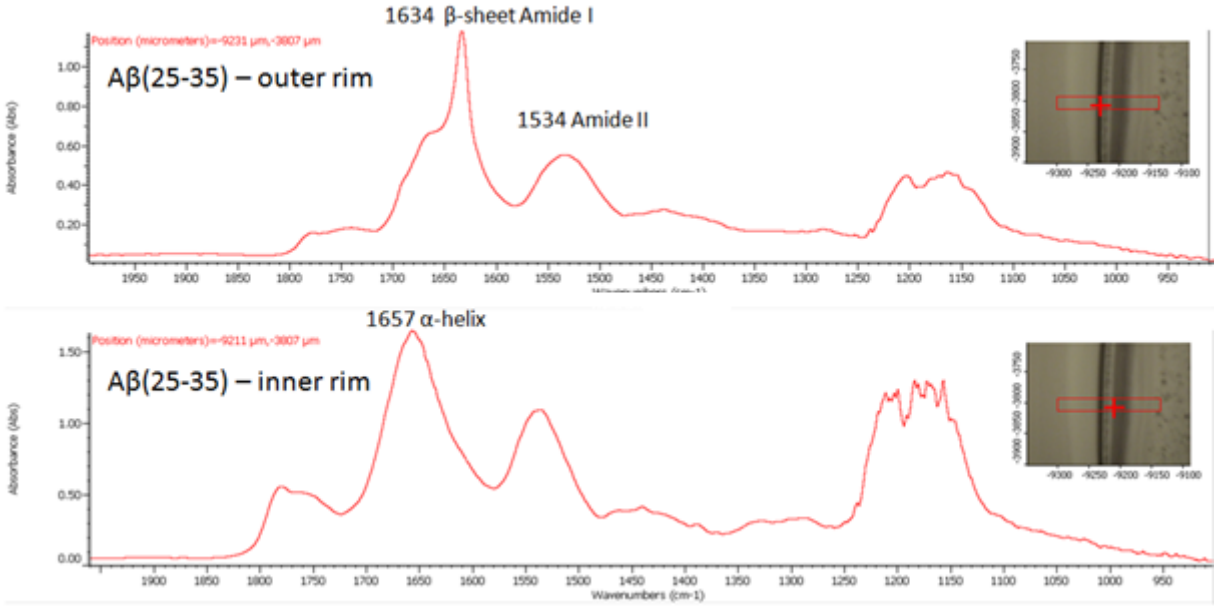

Figure 2 FTIR spectra of the external and internal rim of the Aβ(25–35) residual dried on superhydrophilic BaF_2 surfaces

Experiments were performed with a 6 μm X 6 μm FTIR beam. We performed a mesh of successive line-scans on the several rims inter-phases. We have been able to detect a transition from an α-helical material to β-sheet fibrils in the Aβ(25-35) residual, raster-scanning from the inner part of the rim to the outer part (Figure 2). This could be ascribed to the characteristic microfluidic flows of droplets sitting on a hydrophilic substrate. On the other hand the presence of the phospholipidic system (POPC/POPS) together with Aβ(25-35) showed three distinct features: the presence of antiparallel β-sheet material (1685 cm^{-1}), β-sheet structures (1630 cm^{-1}) and possible β-turns (1670 cm^{-1}) while the presence of α-helix was completely deleted. The Aβ(1-42) residuals on the other hand showed the exclusive presence of β-sheet material in presence and absence of the POPC/POPS system.

The experiment confirmed the influence of the phospholipidic system on the transition from hybrid α/β material to pure β-sheet material. We are currently analyzing the data coming from μXRD experiments performed at the ID13 beamline which seem to confirm the results obtained by FTIR at ID21.