Chemical Stability of Diphenylalanine Peptide Nanotubes in Solution

Karsten B. Andersen,[†] Jaime Castillo-Leon,[†] Martin Hedström,[‡] and Winnie Edith Svendsen*,[†]

[†] DTU - Nanotech, Technical University of Denmark, Lyngby
[‡] Department of Biotechnology, Lund University, Lund
* To whom correspondence should be addressed

E-mail: Winnie.Svendsen@nanotech.dtu.dk

Supporting Online Material

This supplement contains mass spectrometry data and optical microscopy images of the dissolution of peptide nanotubes in solutions where they dissolve slowly along with optical images from the control experiments on the peptide tubes dried under atmospheric conditions.

Experimental Mass Spectrometry Data

To confirm that the peak at *313* m/z in the HPLC traces corresponds to the diphenylalanine (FF) monomers, a mass spectrometry (MS) experiment was conducted. The molecular weight of the FF monomers ($C_{19}H_{20}O_3N_2$) plus the added proton fit this value very well. However, to confirm the results, an MS experiment on the last water sample was conducted. The results from this experiment are shown in Figure S 1. In the figure, the fragments of the FF monomer corresponding to the six largest peaks are also illustrated. The data confirmed that the particle that was found to increase in the HPLC experiments was in fact the FF monomers, which again confirmed the optical observations.

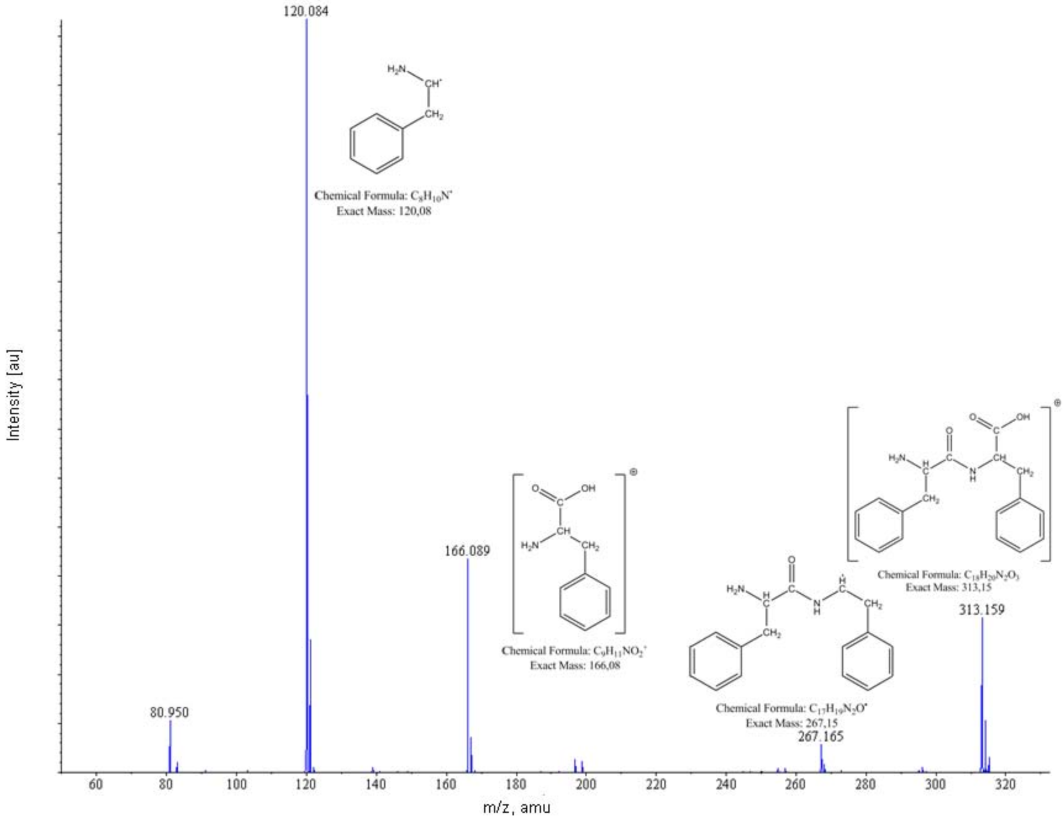

Figure S 1: *Results from the MS experiments on the water sample taken after a dissolution time of 200 min. The figure also illustrates fragments of the FF corresponding to the individual peaks along with the molecular composition of these fragments. This experiment thus confirmed that it was in fact the FF monomer concentration that increased.*

Peptides in Slow Dissolvers

Figure S 2 presents images of the peptides in three solvents in which the dissolution time was long. The peptides have here been monitored over a time span of one hour.

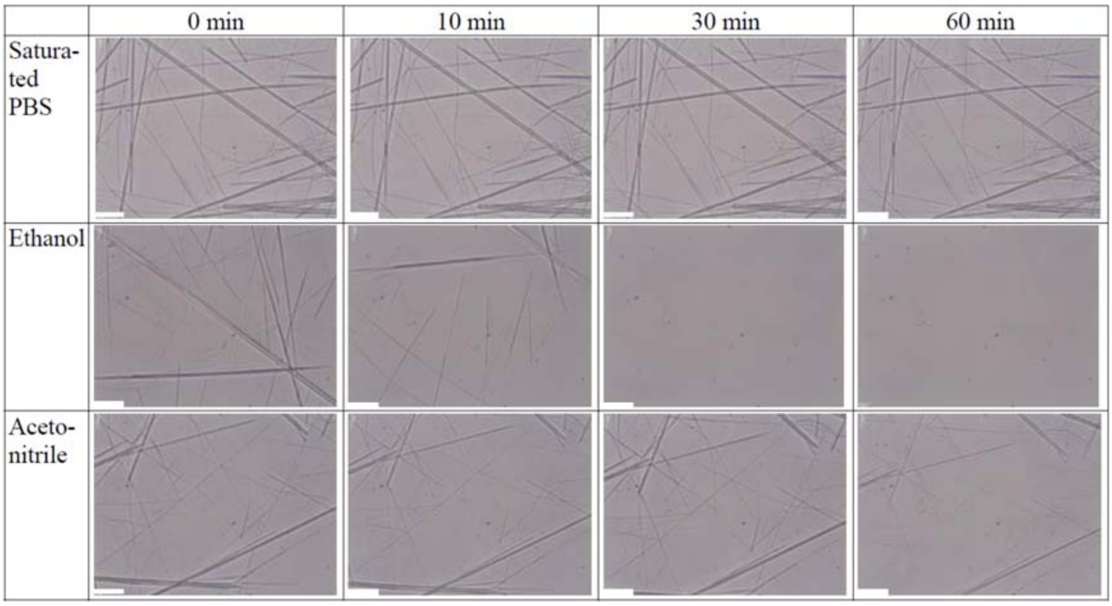

Figure S 2: *Microscopy images of the peptide nanotubes in solutions in which the nanotubes appear to be more stable. The nanotubes were immersed in a) a PBS (pH 7.4) solution saturated with peptide monomers, b) ethanol and finally c) acetonitrile. From these images, it seemed that the nanotubes were stable in the saturated PBS solution and acetonitrile. However, further experiments using gas chromatography revealed that the nanotubes became dissolved in acetonitrile as well. All scale bars in the images correspond to 20 µm.*

Peptides Dried under Atmospheric Conditions

As a control to test whether the drying procedure influenced the results in any way, the peptide tubes where dried in accordance to the procedure described in ref. 14 and submerged in fresh mili q water. Optical images from this control experiment are shown in Figure S 3. The dissolution process where similar to the tubes dried under vacuum conditions, and hence the drying procedure did not influence the experiments.

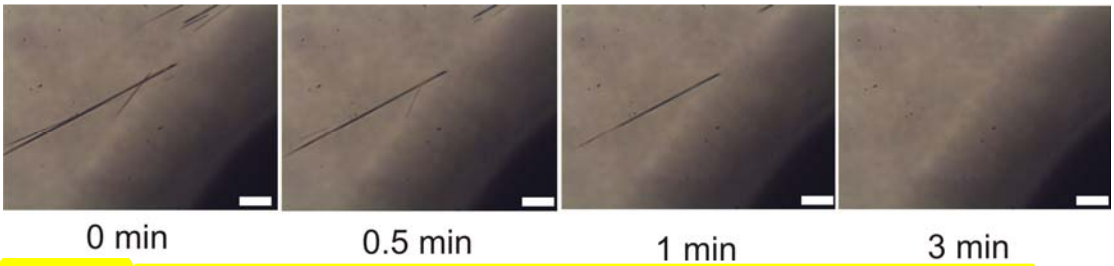

Figure S 3: *Optical microscopy images of the dissolution process in water of peptide nanotubes dried in atmospheric conditions. As it is seen the results are similar to the results from the tubes dried under vacuum conditions.*