Synthesis and self-assembly of perylene diimide-conjugated peptides

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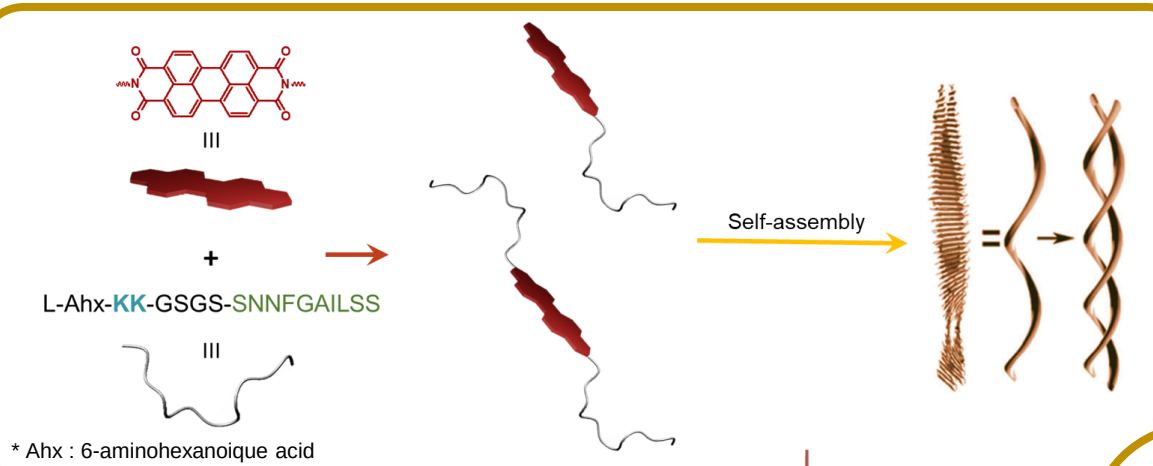
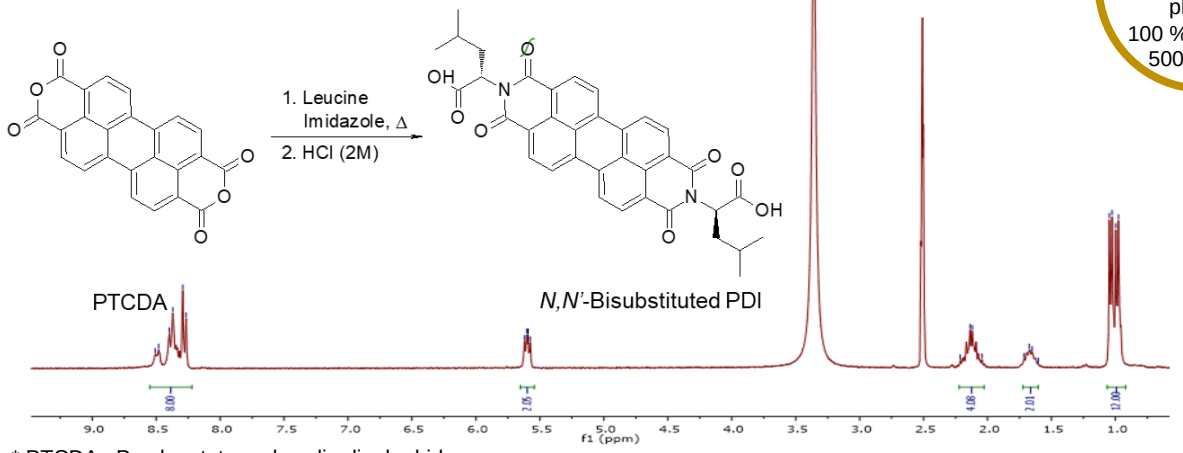
Introduction

Control the directionality of PDI self-assembly into defined nanostructures remains problematic. We exploited the properties of amyloid peptides to design nanofilaments functionalized with PDI.



* Ahx : 6-aminohexanoique acid

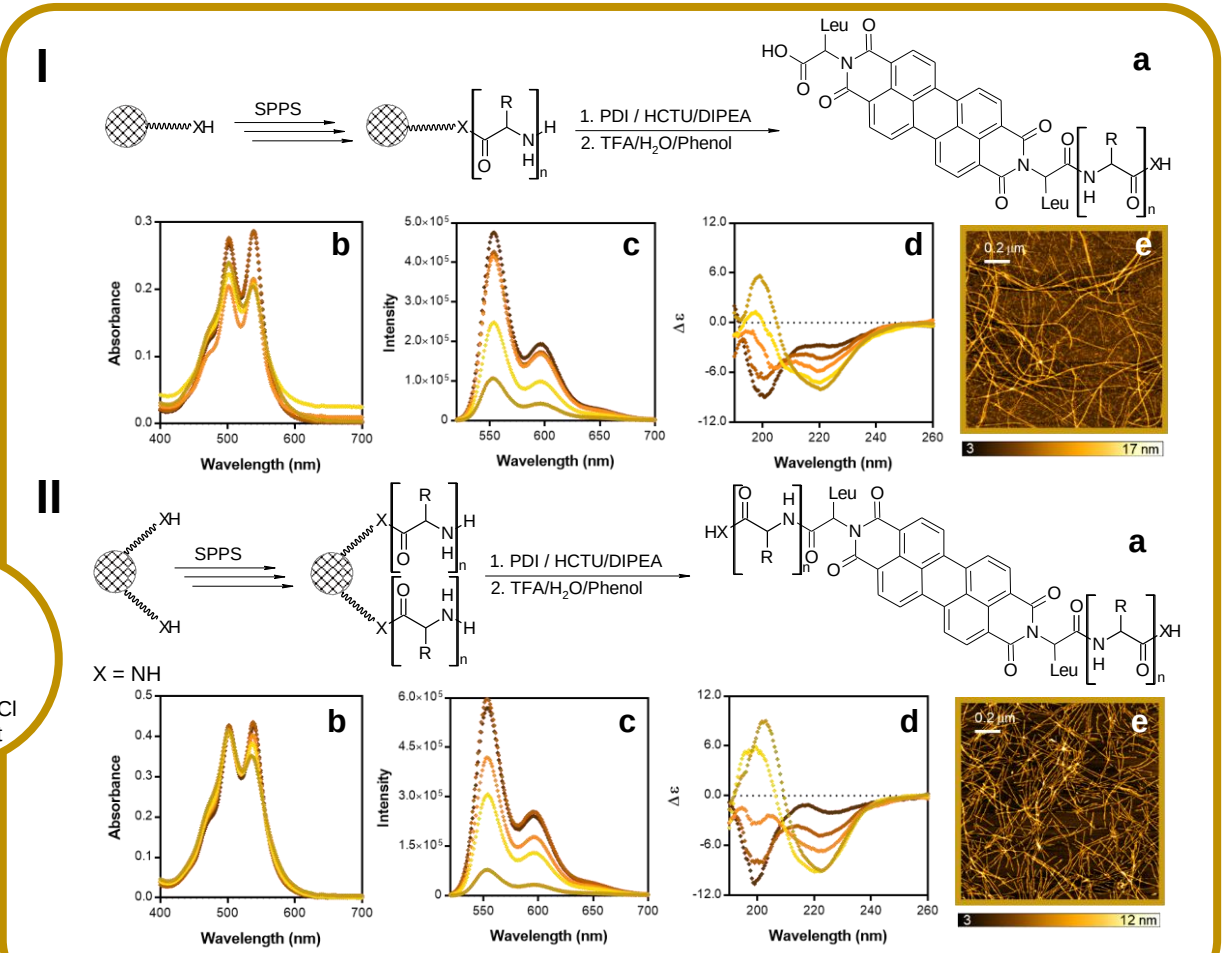
Design perylene diimide-conjugated peptides



* PTCDA : Perylenetetracarboxylic dianhydride
* PDI : Peryledíimide

Synthesis of *N,N'*-bisubstited PDI and ^{1}H-RMN spectra (400 MHz, d_6-DMSO).

pH 7.4
100 % TrisHCl
500 µM / rt



* SPPS : Solid Phase Peptide Synthesis

Synthesis (a), UV-vis (b), fluorescence emission (c), ultraviolet range CD (d) spectra AFM images (e) of PDI-$I_{20\text{-}29}$ (I) and PDI-$[I_{20\text{-}29}]_2$ (II) incubated in Tris Buffer, pH 7.4, at a concentration of 500 µM and under continuous agitation at 0 h, and after 24 h, 48 h, 72 h, and 1 week incubation.

Conclusion

Defined nanostructures functionalized with PDI can be obtained from amyloid peptide building blocks, opening to novel applications in bioimaging, photodynamic therapy and bioelectronic.