Supplementary Information (SI) for Molecular Systems Design & Engineering.

In silico investigation of the interaction between α-synuclein aggregates and organic supramolecular assemblies

Laura Le Bras,[*,†,¶] Yves L. Dory,[‡] and Benoît Champagne[*,†]

†*Unité de Chimie Physique Théorique et Structurale, Chemistry Department, Namur Institute of Structured Matter, University of Namur, Belgium*

‡*Laboratoire de Synthèse Supramoléculaire, Département de Chimie, Institut de Pharmacologie, Université de Sherbrooke, Canada*

¶*Université de Franche-Comté, CNRS, Chrono-environnement, F-25000 Besançon, France*

E-mail: laura.le_bras@univ-fcomte.fr; benoit.champagne@unamur.be

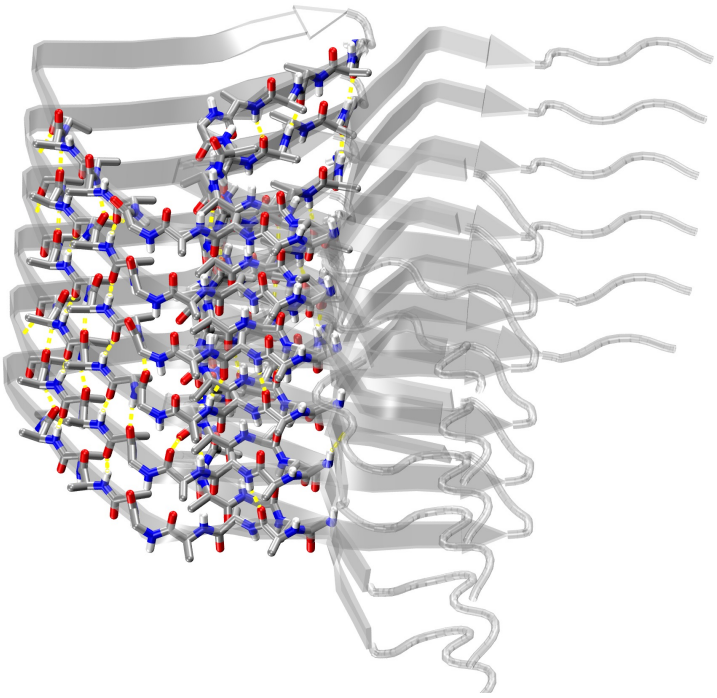

Figure S1: Representation of the numerous hydrogen bonds (yellow dashed lines) occurring within the structure of α**SYN**$_6$. To ease the comprehension, only PreNAC and NACore have been represented as bold sticks. The lateral have not been represented at all.

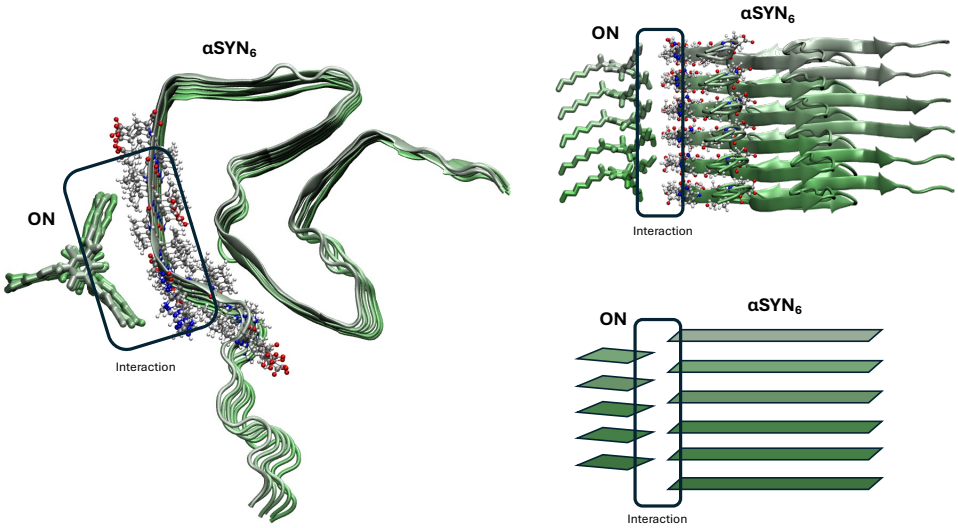

Figure S2: Representation of the side-to-side interaction pattern of an organic nanotube (**B4**) with α**SYN**$_6$.

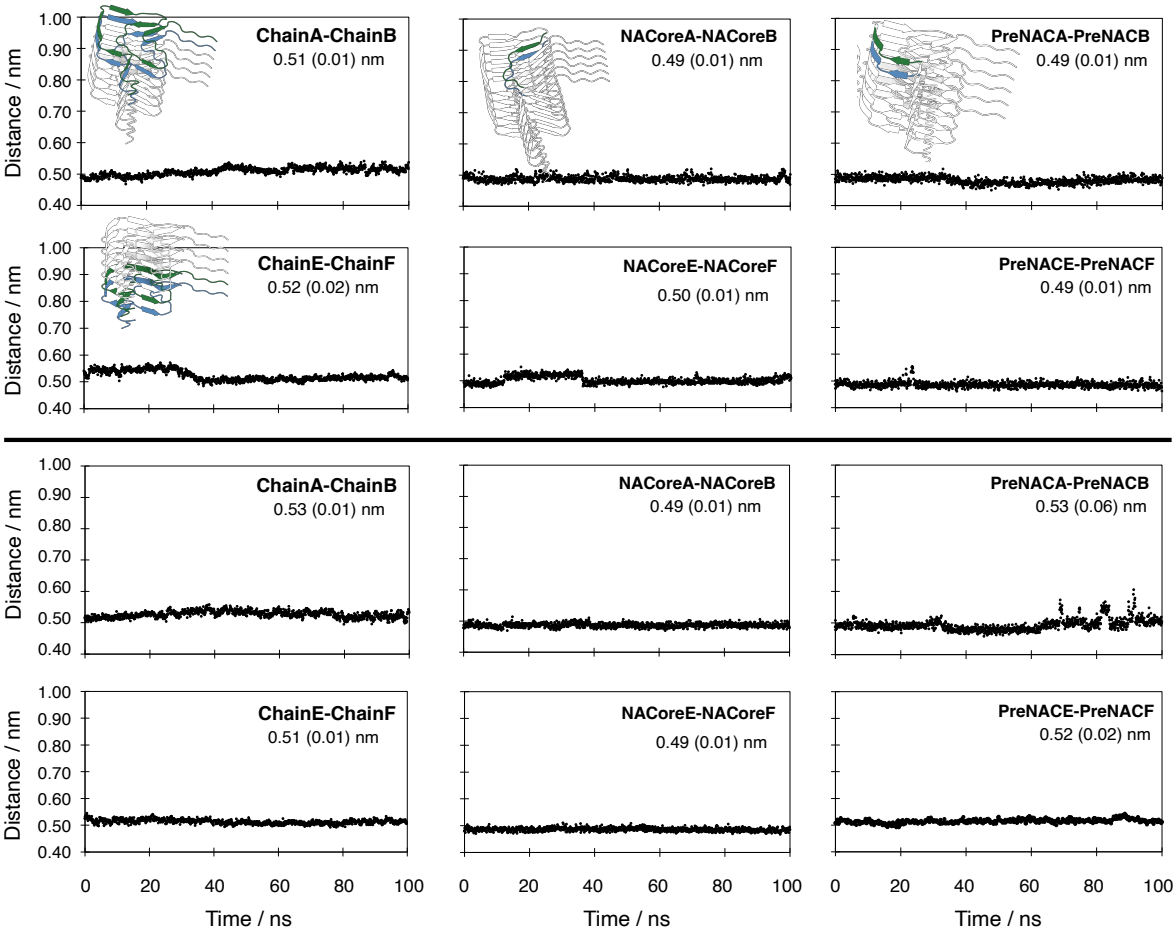

Figure S3: Evolution of different distances, in nm, between center of mass (com) of different assemblies along the 100 ns simulation of $(\alpha\mathbf{SYN}_6)_2$. The six first graphics represent a side of the dimer of $(\alpha\mathbf{SYN}_6)_2$ and the last six graphics represent the other side of $(\alpha\mathbf{SYN}_6)_2$.

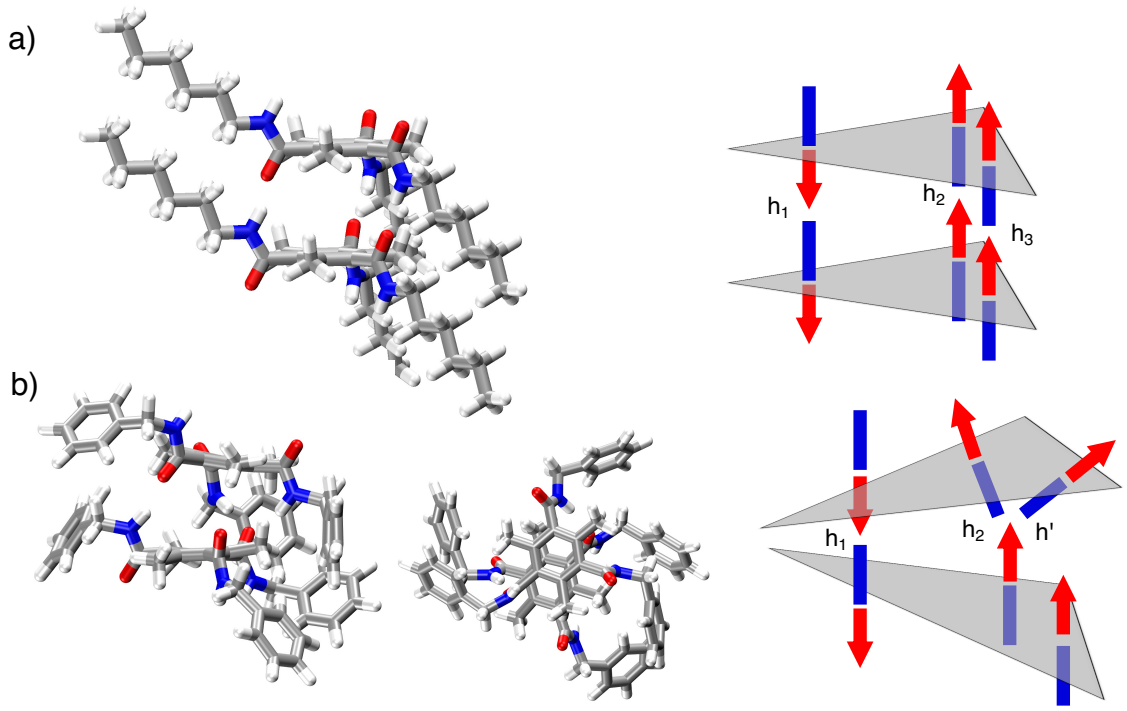

Figure S4: Representation of a) a classic stacking of two **B4** molecules with the three H-Bond, namely h_1, h_2, and h_3 and b) a stacking of two **B4p** molecules (with a side and a top view) with h_1 that is always effective and both h_2 and the h' H-bond, also known as a bifurcated H-Bond. h_3 is not effective in this particular structure. Each time, a schematic representation has been given on the right of the structures to ease the comprehension.

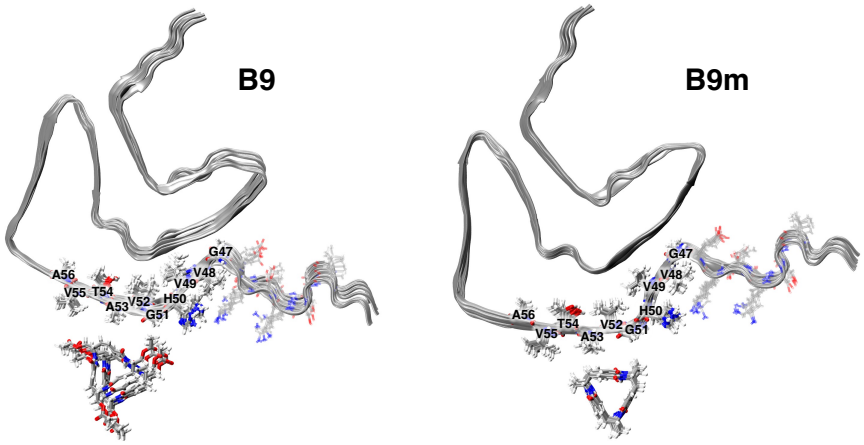

Figure S5: Representation of the initial structure of the system 1 **ON** + α**SYN**$_6$ for **B9** and **B9m**. It illustrates the lack of space to add a second **ON** close to the PreNAC are. The 10 residues of PreNAC (from G47 to A56) have been assigned and the residues from 40 to 47 have also been represented as transparent bold sticks to show the steric hindrance in this area.

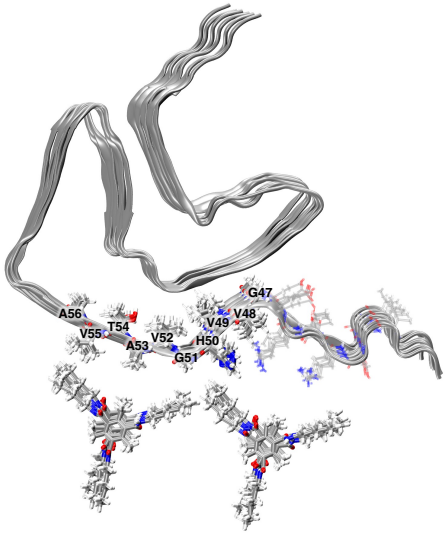

Figure S6: Representation of the initial structure of the system 2 **ONs** + α**SYN**$_6$ for **B4**. It illustrates the lack of space to add a third **ON** close to the PreNAC are. The 10 residues of PreNAC (from G47 to A56) have been assigned and the residues from 40 to 47 have also been represented as transparent bold sticks to show the steric hindrance in this area.

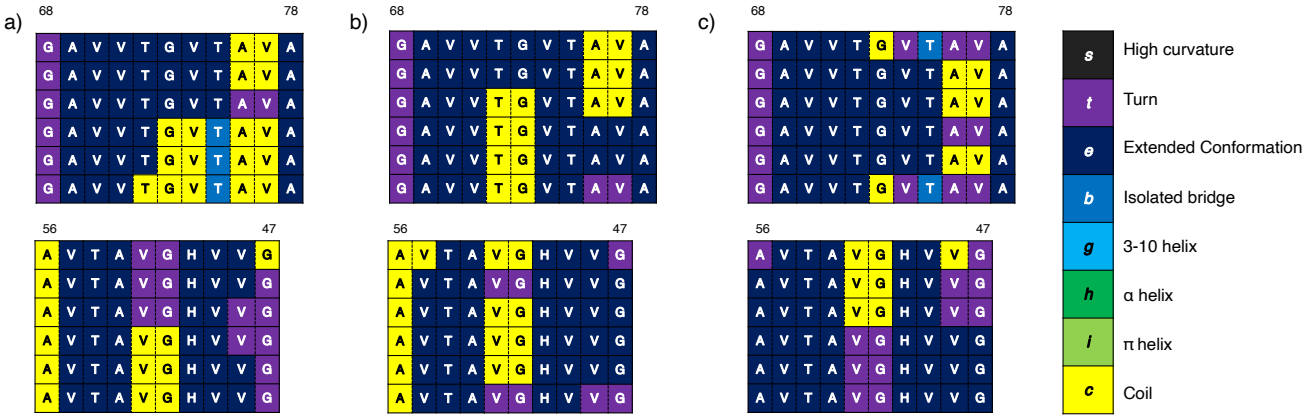

Figure S7: Representation of the secondary structure assignation of α**SYN**$_6$ according to STRIDE algorithm in VMD for the interaction with a) 1 **ON**, b) 2 **ONs** and c) 3 **ONs** of **B4c**. NACore residues are at the bottom and PreNAC residues are on top of the figure.

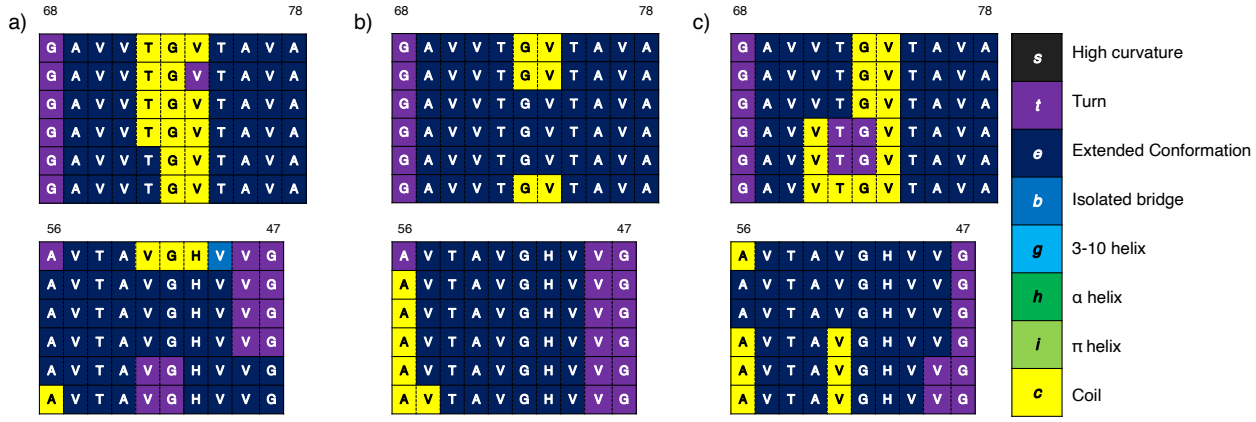

Figure S8: Representation of the secondary structure assignation of α**SYN**$_6$ according to STRIDE algorithm in VMD for the interaction with a) 1 **ON**, b) 2 **ONs** and c) 3 **ONs** of **B4pI**. NACore residues are at the bottom and PreNAC residues are on top of the figure.

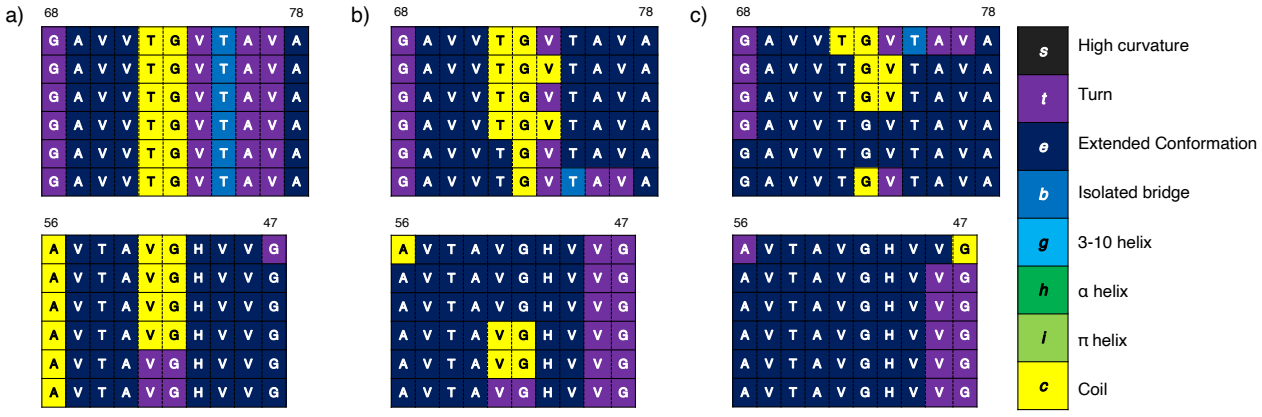

Figure S9: Representation of the secondary structure assignation of α**SYN**$_6$ according to STRIDE algorithm in VMD for the interaction with a) 1 **ON**, b) 2 **ONs** and c) 3 **ONs** of **B4p**. NACore residues are at the bottom and PreNAC residues are on top of the figure.

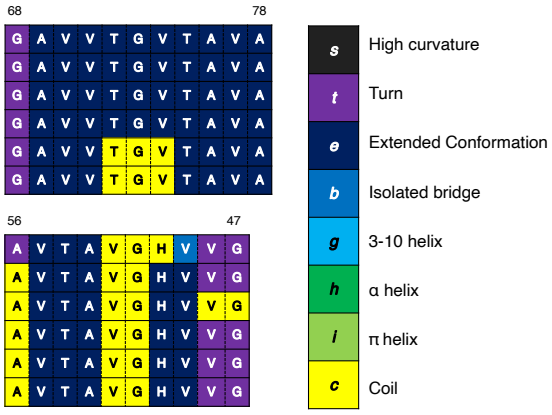

Figure S10: Representation of the secondary structure assignation of α**SYN**$_6$ according to STRIDE algorithm in VMD for the interaction with 1 **ON** of **B9m**. NACore residues are at the bottom and PreNAC residues are on top of the figure.