Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Molecular Dynamics Simulations of α-Synuclein NAC Domain Fragment with ff14IDPSFF IDP-specific Force Field Suggest β-Sheet Intermediate State for Fibrillation

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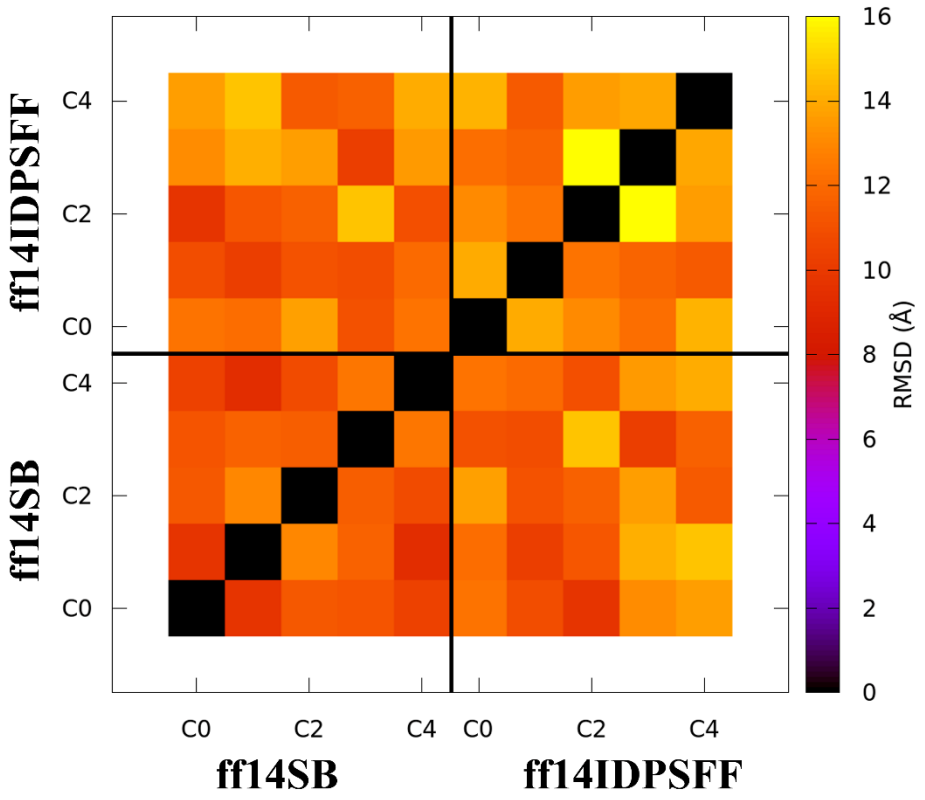

Figure S1. 2D-RMSD of the representative conformations of the fifth-most populated clusters of EαSNAC using ff14SB and ff14IDPSFF force fields. RMSD is calculated only with the C_α atoms of the peptides.

	ff14SB	**ff14IDPSFF**
$\Delta d_{c0}^{centroid}$ (Å)	*4.2*	*6.1*
$\Delta d_{c1}^{centroid}$ (Å)	*4.4*	*5.7*
$\Delta d_{c2}^{centroid}$ (Å)	*4.7*	*6.9*
$\Delta d_{c3}^{centroid}$ (Å)	*5.2*	*5.5*
$\Delta d_{c4}^{centroid}$ (Å)	*4.1*	*5.6*
DBI	*1.33*	*1.37*
psF	*40985*	*33522*
SSR/SST	*0.657*	*0.610*

Table S1. Indicators of goodness of the clustering algorithm in the ff14SB and ff14IDPSFF simulations. $\Delta d_{cX}^{centroid}$, DBI, psF and SSR/SST are the average distance-to-centroid of cluster X, the Davis-Bouldin Index, the pseudo-statistic F and sum of squares regression/sum of squares total magnitudes, respectively.

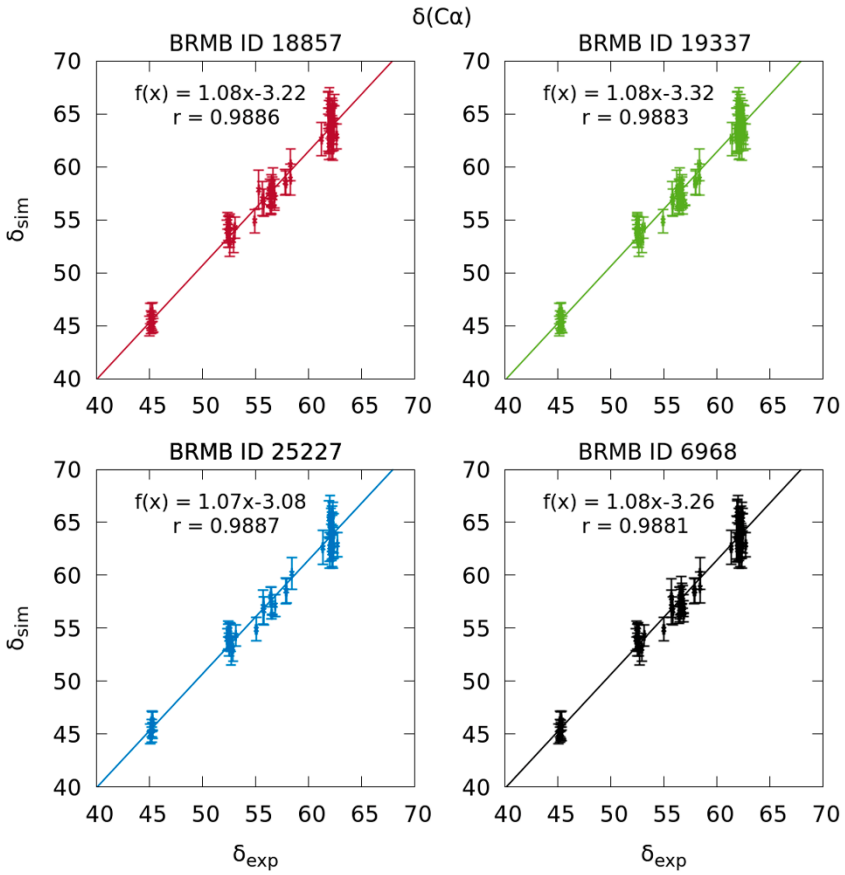

Figure S2. Correlation between measured (δ_{exp}) and predicted (δ_{sim}) chemical shifts of the Cα atom for the four BRMB data sets (18857, 19337, 25227 and 6968) in ff14SB simulations. Deviation of measured and predicted chemical shifts are represented in vertical and horizontal error bars, respectively. The linear equations obtained by fitting chemical shift data and Pearson correlation coefficient (r) is also indicated in the plot.

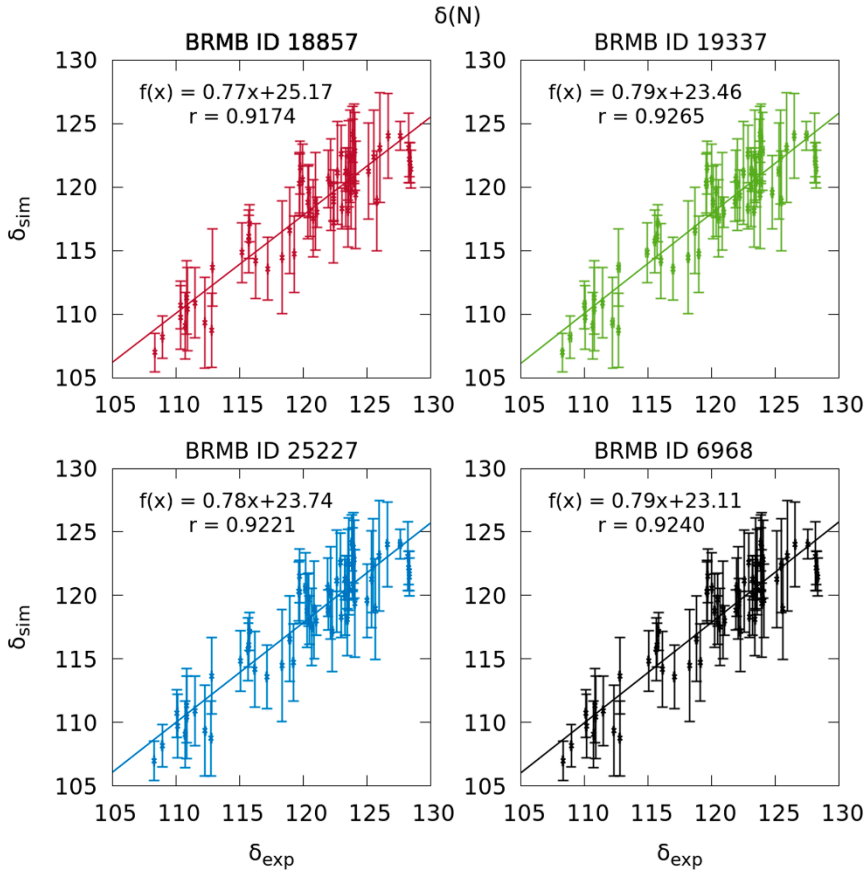

Figure S3. Correlation between measured (δ_{exp}) and predicted (δ_{sim}) chemical shifts of the N atom for the four BRMB data sets (18857, 19337, 25227 and 6968) in ff14SB simulations. Deviation of measured and predicted chemical shifts are represented in vertical and horizontal error bars, respectively. The linear equations obtained by fitting chemical shift data and Pearson correlation coefficient (r) is also indicated in the plot.

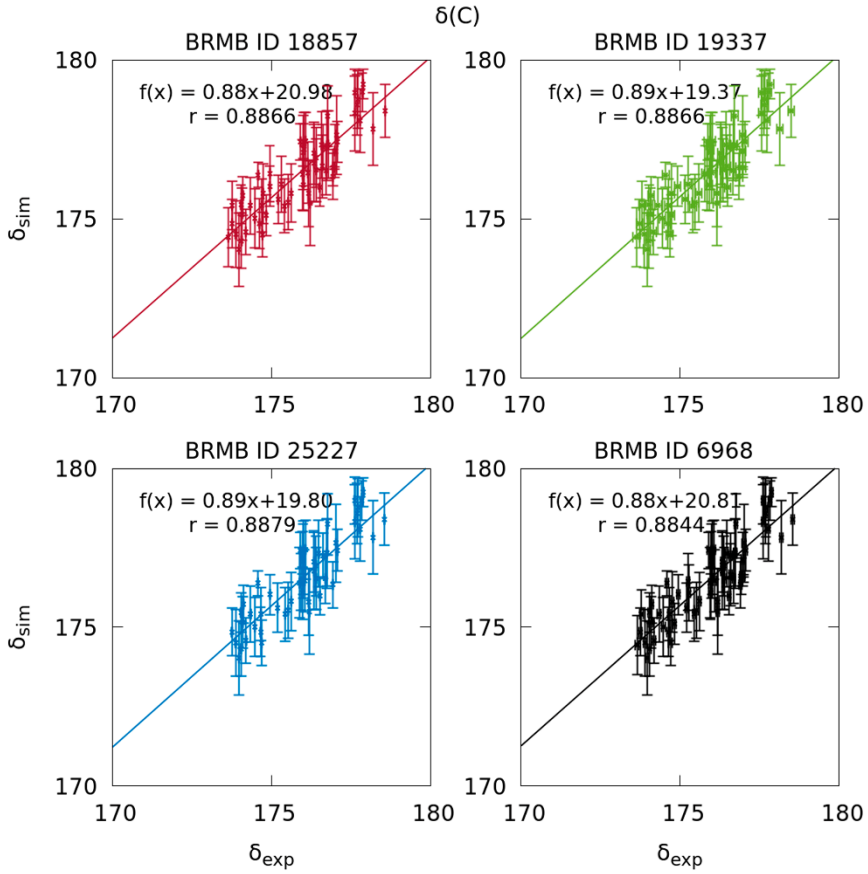

Figure S4. Correlation between measured (δ_{exp}) and predicted (δ_{sim}) chemical shifts of the C atom for the four BRMB data sets (18857, 19337, 25227 and 6968) in ff14SB simulations. Deviation of measured and predicted chemical shifts are represented in vertical and horizontal error bars, respectively. The linear equations obtained by fitting chemical shift data and Pearson correlation coefficient (r) is also indicated in the plot.

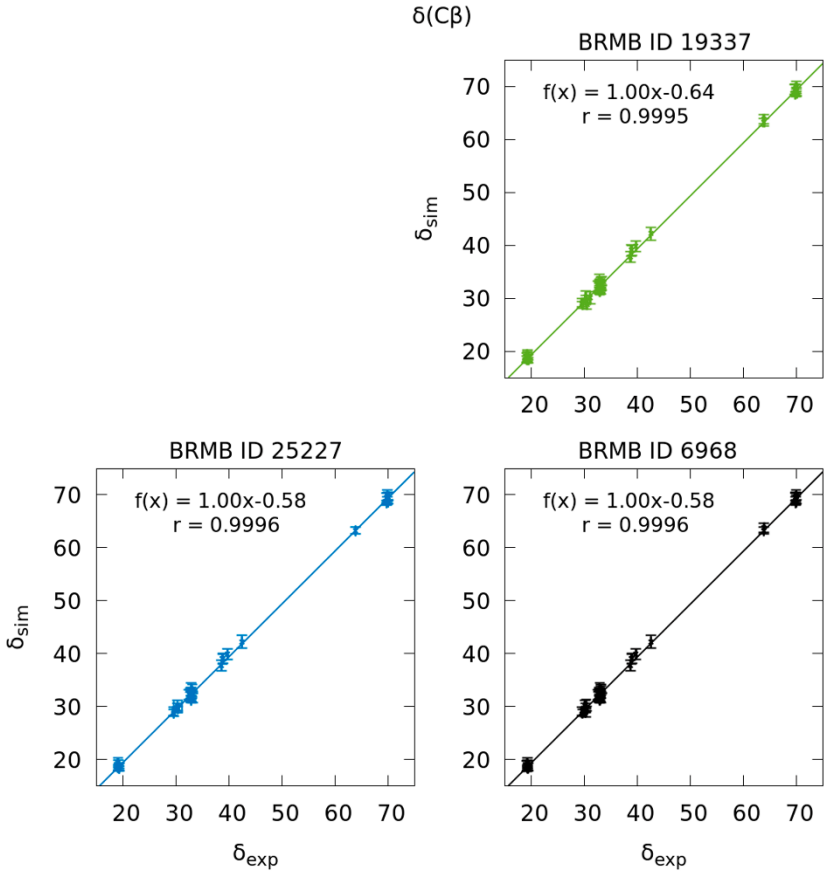

Figure S5. Correlation between measured (δ_{exp}) and predicted (δ_{sim}) chemical shifts of the Cβ atom for the four BRMB data sets (18857, 19337, 25227 and 6968) in ff14SB simulations. Deviation of measured and predicted chemical shifts are represented in vertical and horizontal error bars, respectively. The linear equations obtained by fitting chemical shift data and Pearson correlation coefficient (r) is also indicated in the plot.

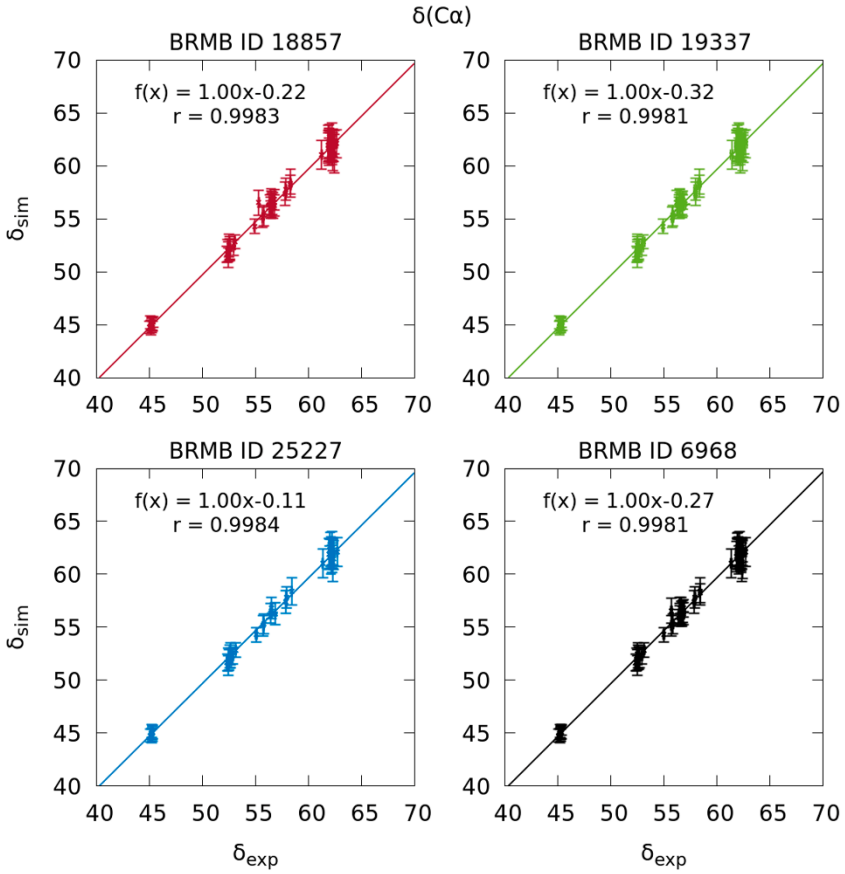

Figure S6. Correlation between measured (δ_{exp}) and predicted (δ_{sim}) chemical shifts of the Cα atom for the four BRMB data sets (18857, 19337, 25227 and 6968) in ff14IDPSFF simulations. Deviation of measured and predicted chemical shifts are represented in vertical and horizontal error bars, respectively. The linear equations obtained by fitting chemical shift data and Pearson correlation coefficient (r) is also indicated in the plot.

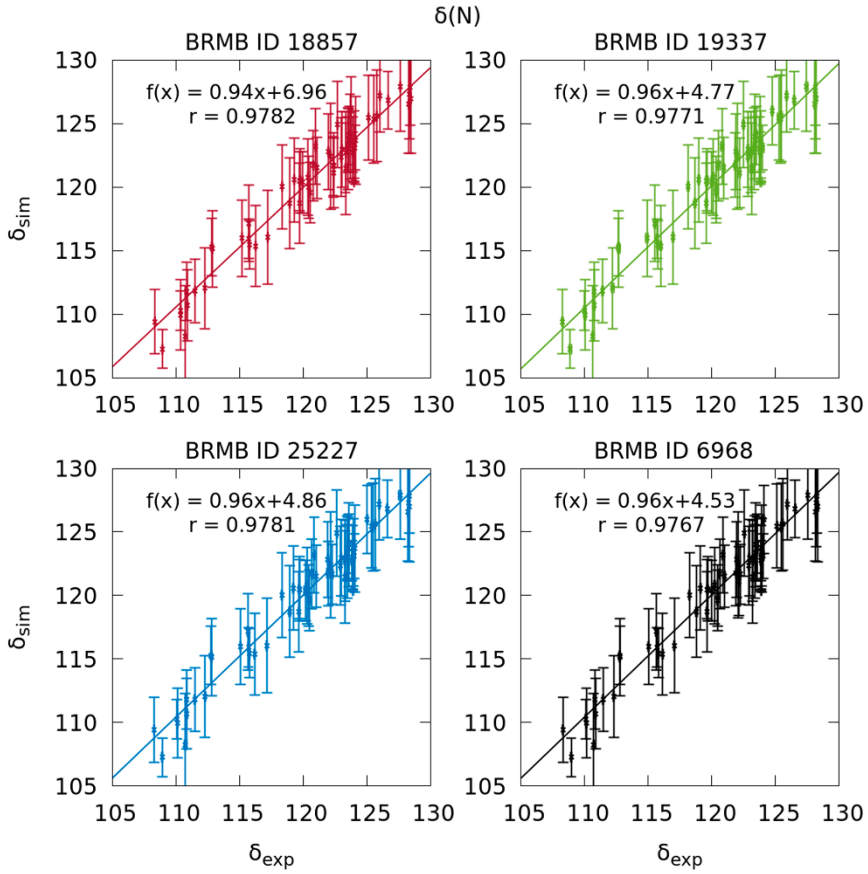

Figure S7. Correlation between measured (δ_{exp}) and predicted (δ_{sim}) chemical shifts of the N atom for the four BRMB data sets (18857, 19337, 25227 and 6968) in ff14IDPSFF simulations. Deviation of measured and predicted chemical shifts are represented in vertical and horizontal error bars, respectively. The linear equations obtained by fitting chemical shift data and Pearson correlation coefficient (r) is also indicated in the plot.

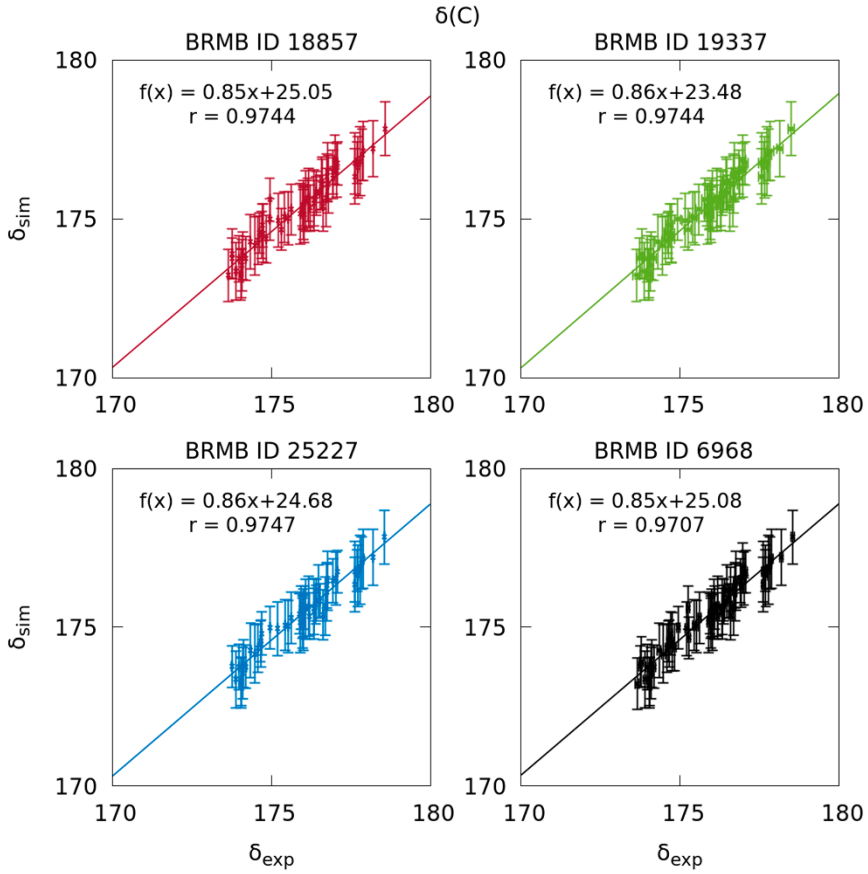

Figure S8. Correlation between measured (δ_{exp}) and predicted (δ_{sim}) chemical shifts of the C atom for the four BRMB data sets (18857, 19337, 25227 and 6968) in ff14IDPSFF simulations. Deviation of measured and predicted chemical shifts are represented in vertical and horizontal error bars, respectively. The linear equations obtained by fitting chemical shift data and Pearson correlation coefficient (r) is also indicated in the plot.

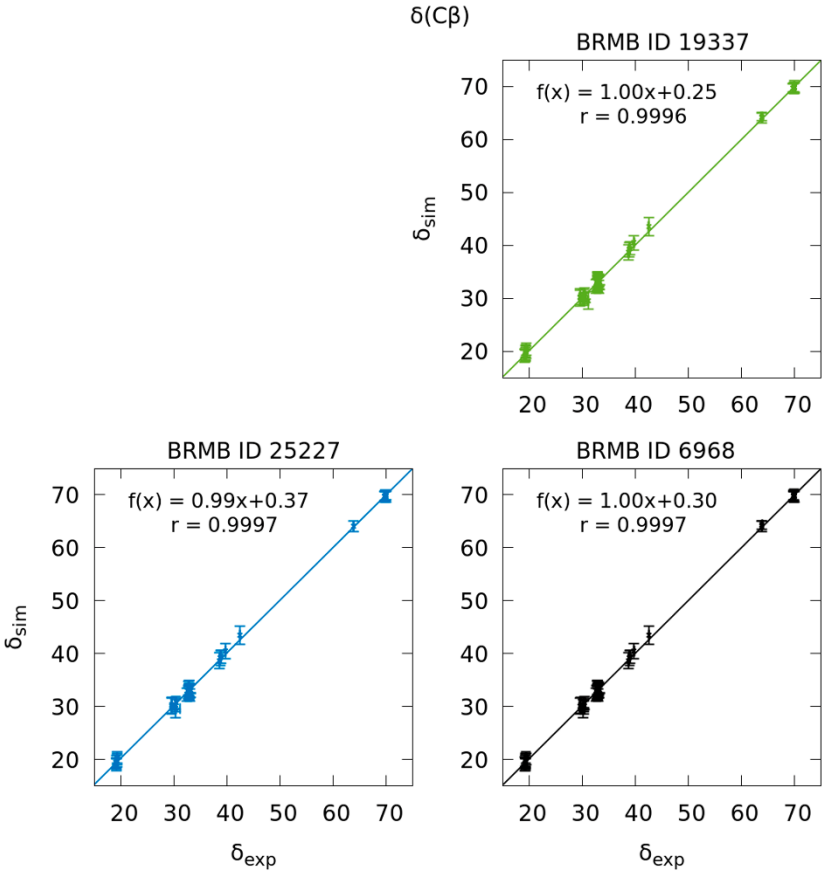

Figure S9. Correlation between measured (δ_{exp}) and predicted (δ_{sim}) chemical shifts of the C^{β} atom for the four BRMB data sets (18857, 19337, 25227 and 6968) in ff14IDPSFF simulations. Deviation of measured and predicted chemical shifts are represented in vertical and horizontal error bars, respectively. The linear equations obtained by fitting chemical shift data and Pearson correlation coefficient (r) is also indicated in the plot.

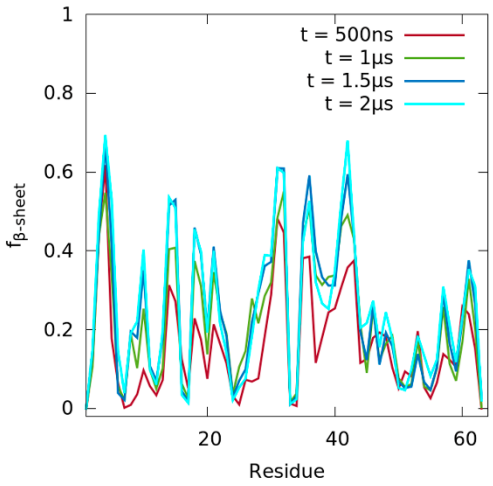

Figure S10. Fraction of β-sheet content at four simulation times (0.5, 1, 1.5 and 2 μs) of EαSNAC in ff14IDPSFF simulations. β-sheet content is defined as the sum of anti-parallel and parallel β-structures propensities determined by DSSP method.