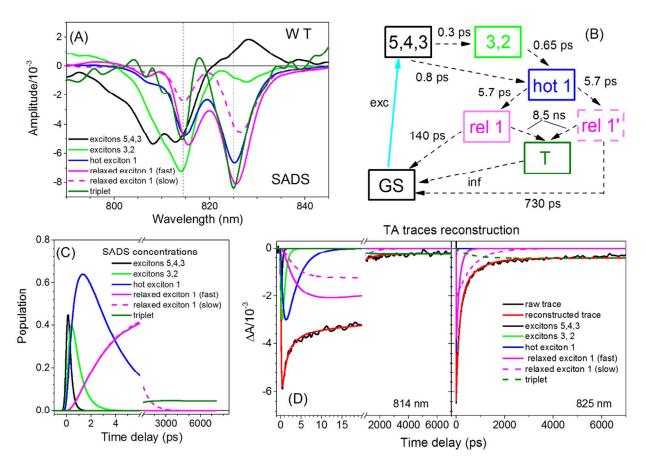
## **Supporting Information**

## Ultrafast Spectroscopic Investigation of Energy Transfer in Site-Directed Mutants of the Fenna-Matthews-Olson (FMO) Antenna Complex from *Chlorobaculum tepidum*

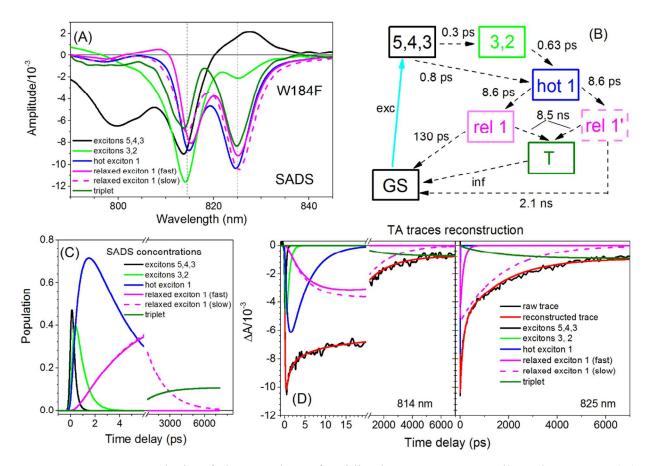
Nikki Cecil M. Magdaong,<sup>1,2,3</sup> Rafael G. Saer,<sup>1,3</sup> Dariusz M. Niedzwiedzki,<sup>3</sup> and Robert E. Blankenship<sup>1,2,3\*</sup>

<sup>1</sup>Department of Biology, Washington University in Saint Louis, One Brookings Drive, St. Louis, MO 63130 USA <sup>2</sup>Department of Chemistry, Washington University in Saint Louis, One Brookings Drive, St. Louis, MO 63130 USA <sup>3</sup>Photosynthetic Antenna Research Center, Washington University in Saint Louis, One Brookings Drive, St. Louis, MO 63130 USA

\*Corresponding author\*: Robert E. Blankenship; Departments of Biology and Chemistry, Washington University in St. Louis, St. Louis, MO 63130-4899, USA. Tel.: +1 314 935-7971; fax +1 314 935-4432.



**Figure S1.** Target analysis of the TA data of oxidized WT FMO collected at 77 K. (A) Species associated decay spectra (SADS) obtained from target analysis, (B) Detailed kinetic model used for data simulation, (C) Time-dependent concentrations of SADS, (D) Reconstruction of two representative TA traces into individual kinetic components according to the kinetic model used in target analysis. GS – ground state, T – triplet state, hot 1 – vibrationally/energetically unrelaxed exciton 1, rel 1/rel 1' – vibrationally/energetically relaxed exciton 1.



**Figure S2.** Target analysis of the TA data of oxidized W184F FMO collected at 77 K. (A) Species associated decay spectra (SADS) obtained from target analysis, (B) Detailed kinetic model used for data simulation, (C) Time-dependent concentrations of SADS, (D) Reconstruction of two representative TA traces into individual kinetic components according to the kinetic model used in target analysis. GS – ground state, T – triplet state, hot 1 – vibrationally/energetically unrelaxed exciton 1, rel 1/rel 1' – vibrationally/energetically relaxed exciton 1.