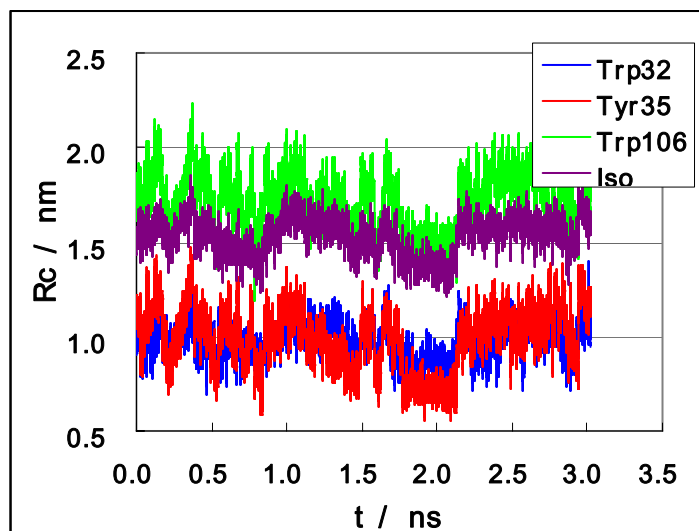
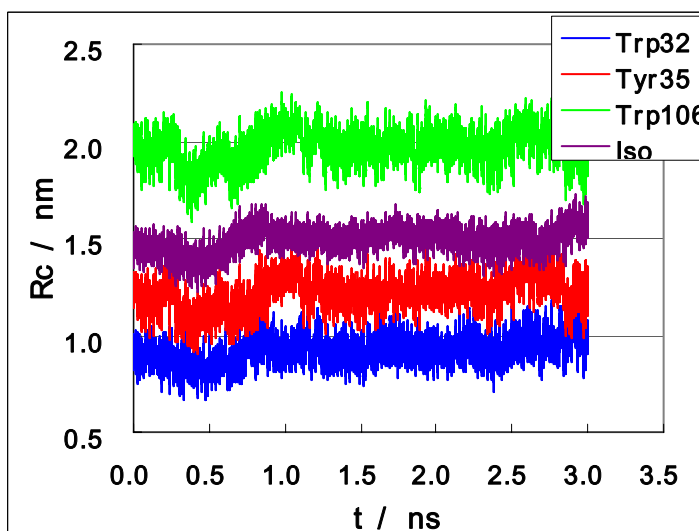


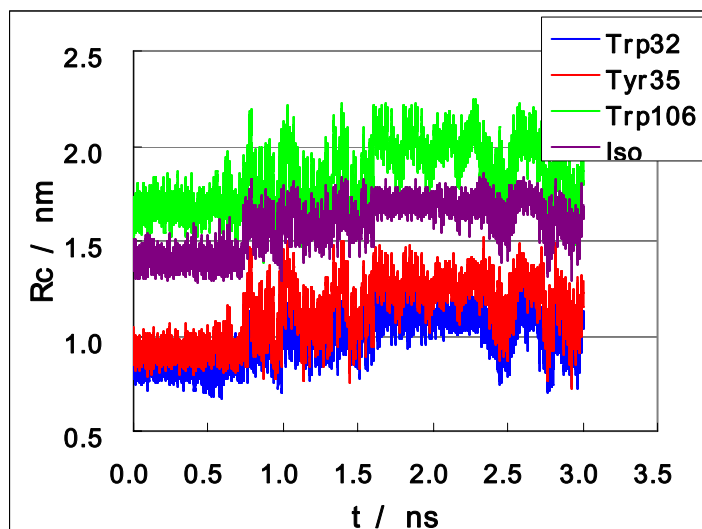
WT



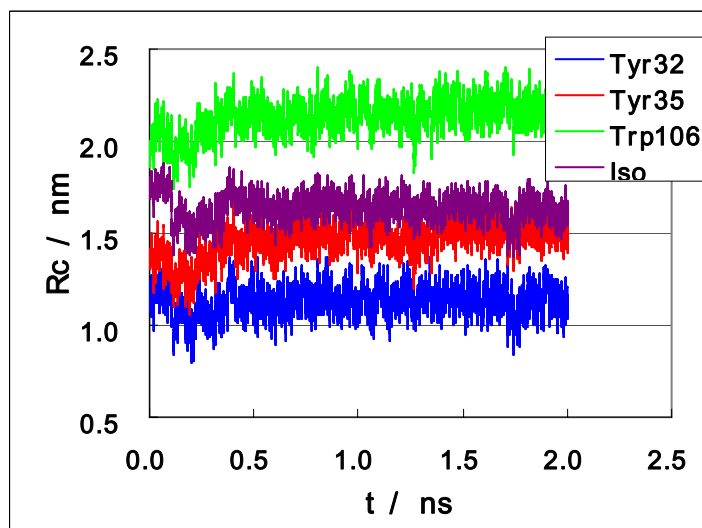
E13T



E13Q



W32Y



W32A

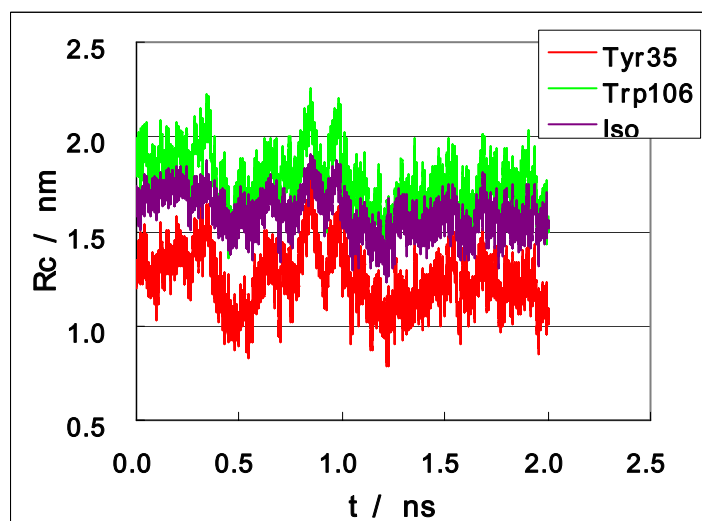
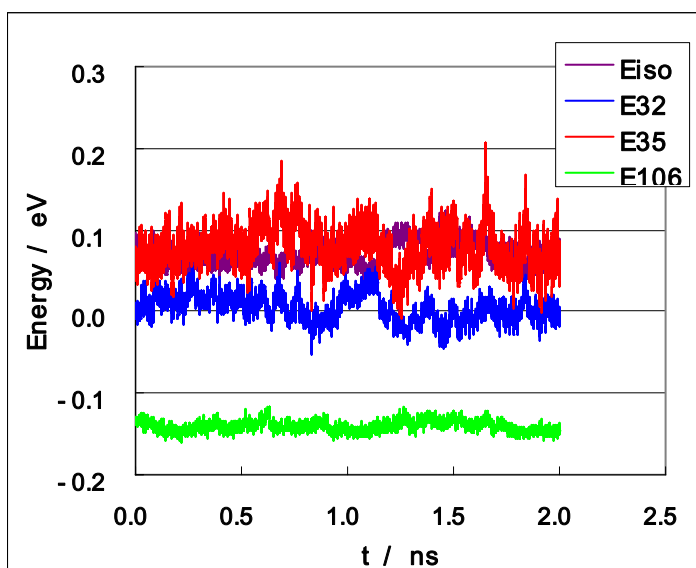
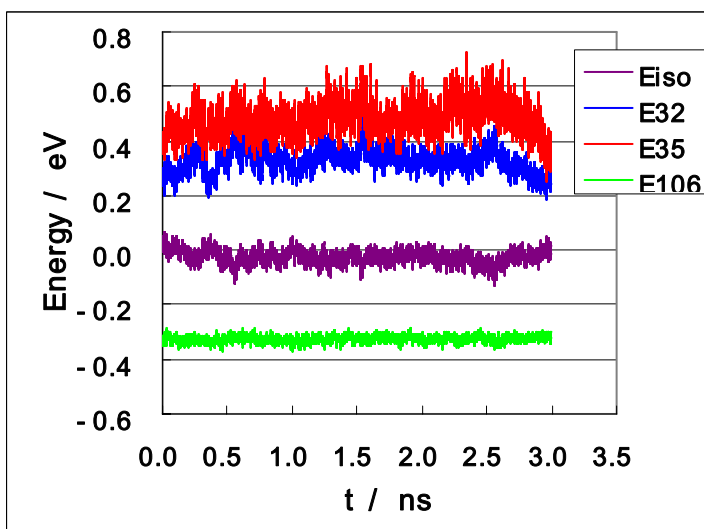


Figure S1 Time-dependent change in the distance between 13th amino acid and ET donor or acceptor.
Mean distances are listed in Table 2.

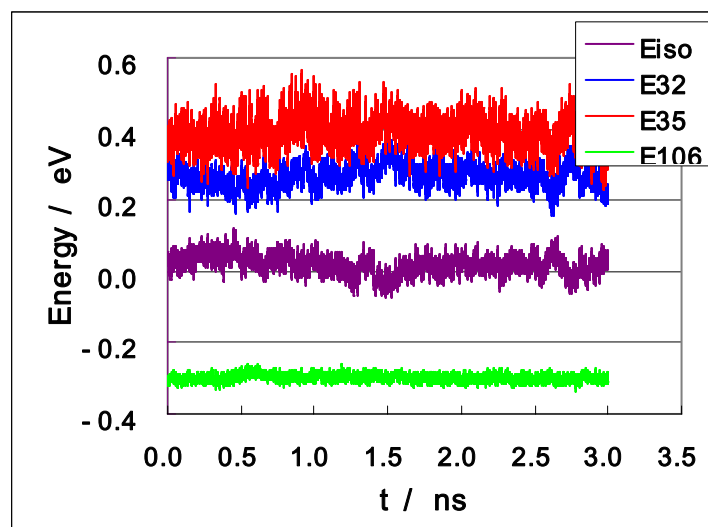
WT



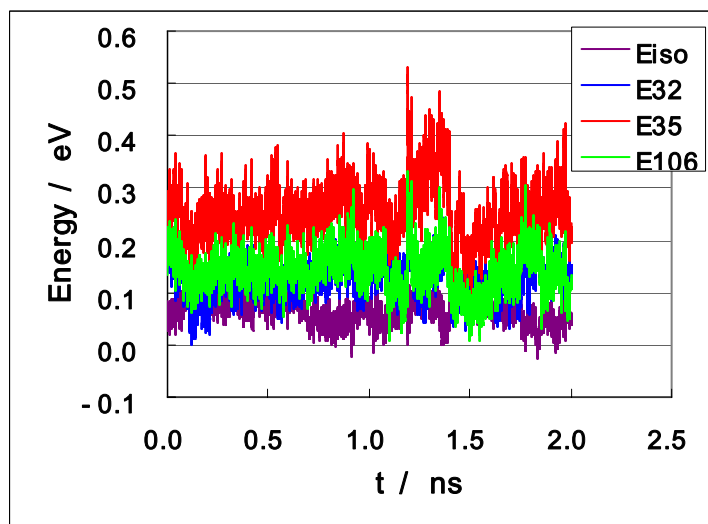
E13T



E13Q



W32Y



W32A

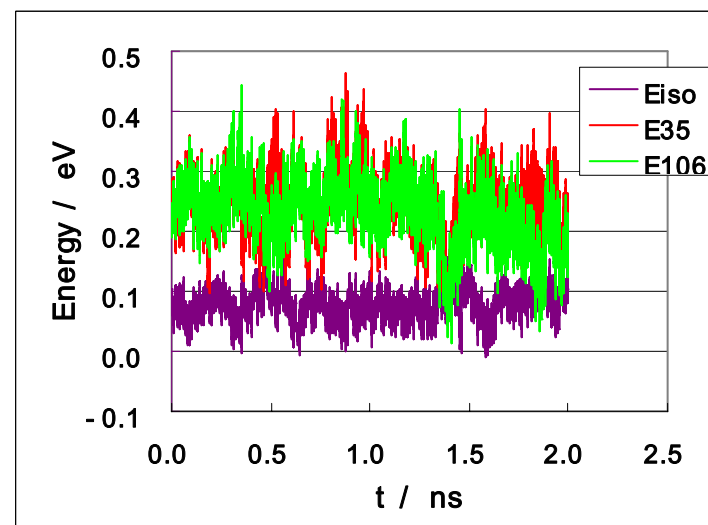
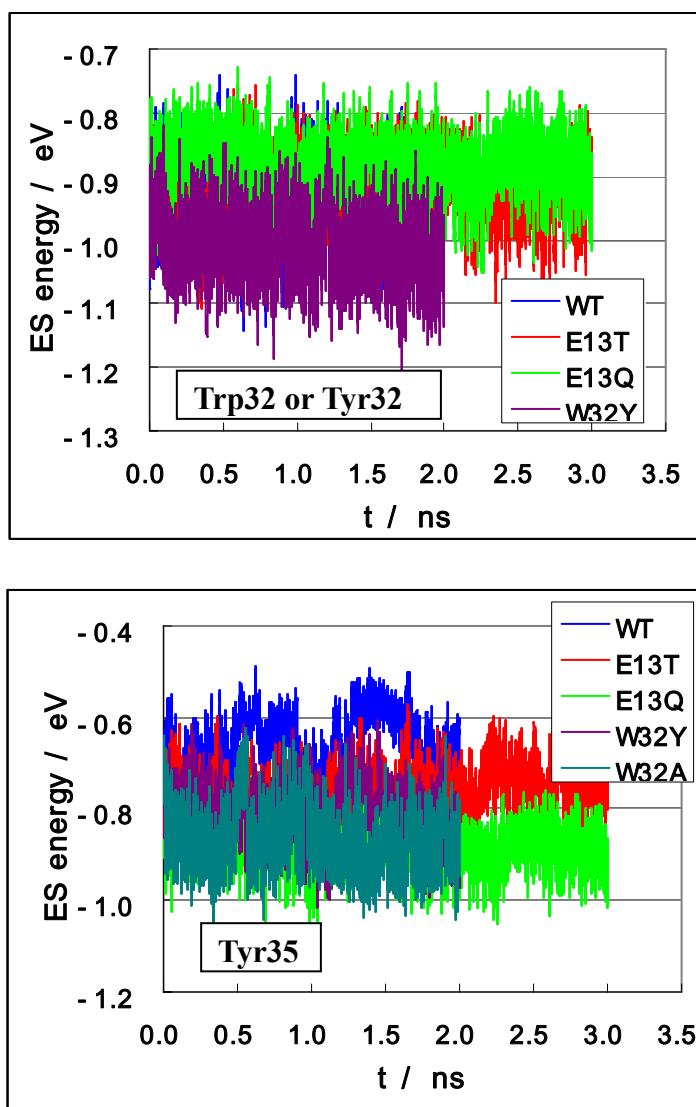


Figure S2 Time-dependent change in ES energy between photo-products and the other ionic amino acids.

The energy is given by eq 5, $E_j(k)$, where $j = \text{WT, E13T, E13Q, W32Y}$ and W32A , and $k = 1$ for Trp32 (Tyr32 in W32Y), 2 for Tyr35 and 3 for Trp106. Inserts show aromatic ionic species of photo-products.



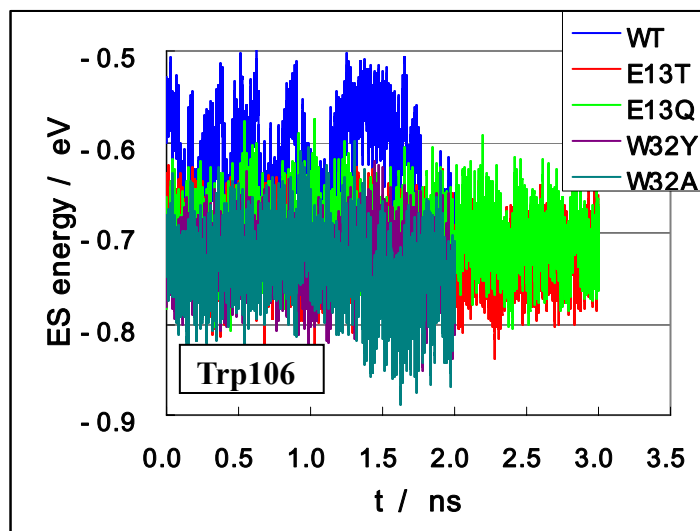
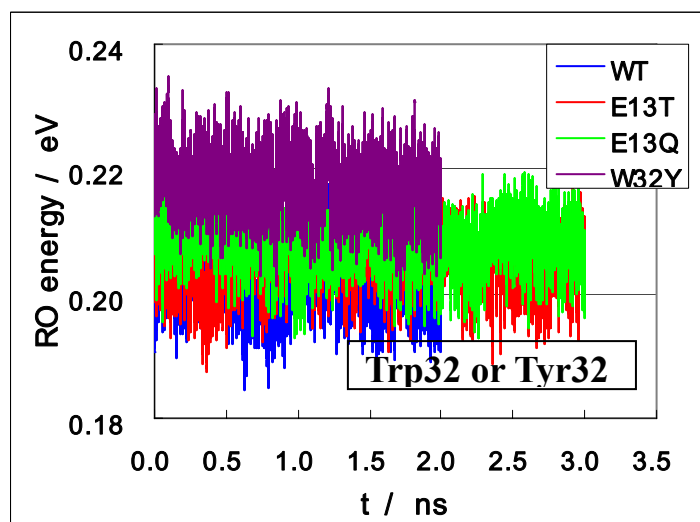


Figure S3 Time-dependent change in ES energy between ET donor cation and acceptor anion.

Top panel shows ES energies between Iso anion and Trp32 (Tyr32 in W32A) in all FBP systems. Middle panel shows ES energies between Iso anion and Tyr35 cation. Bottom panel shows ES energy between Iso anion and Trp106 cation.



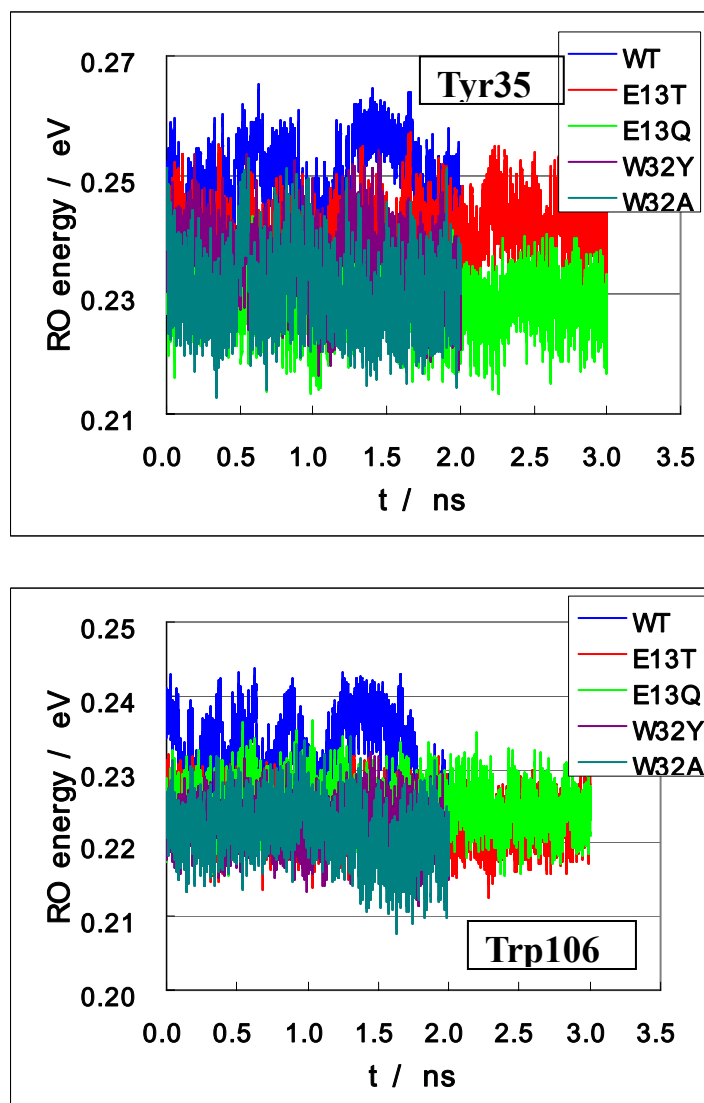


Figure S4 Time-dependent change in solvent reorganization energy.

RO energy denotes λ_s^{jk} given by eq 2. Top panel shows the energy for Trp32 in WT, E13T, E13Q or for Tyr32 in W32Y, middle panel for Tyr35 and bottom panel for Trp106.