Low-Temperature Raman Spectroscopy of Halorhodopsin from *Natronomonas pharaonis*: Structural Discrimination of Blue-shifted and Red-shifted Photoproducts

Tomotsumi Fujisawa¹*, Hayato Kiyota¹, Takashi Kikukawa²,³, Masashi Unno¹*

¹ Department of Chemistry and Applied Chemistry, Faculty of Science and Engineering, Saga University, Saga 840-8502, Japan
² Faculty of Advanced Life Science, Hokkaido University, Sapporo 060-0810, Japan
³ Global Station for Soft Matter, Global Institution for Collaborative Research and Education, Hokkaido University, Sapporo 060-0810, Japan

Supporting Information

Figure S1: Raman spectra of pHR dark state with Cl⁻ in H₂O and D₂O
Figure S2: Raman spectra of pHR in dark state, pHRₖ, pHRₜₘₑₜ with Br⁻
Figure S3: Raman spectra of pHR in dark state, pHRₖ, pHRₜₘₑₜ with I⁻
Figure S1. Raman spectra of $\rho$HR dark state with Cl$^-$ in H$_2$O and D$_2$O
Figure S2. Raman spectra of $pHR$ in dark state, $pHR_K$, $pHR_{hypso}$ with $Br^-$. 
Figure S3. Raman spectra of pH in dark state, pH_{K}, pH_{hypso} with I⁻