

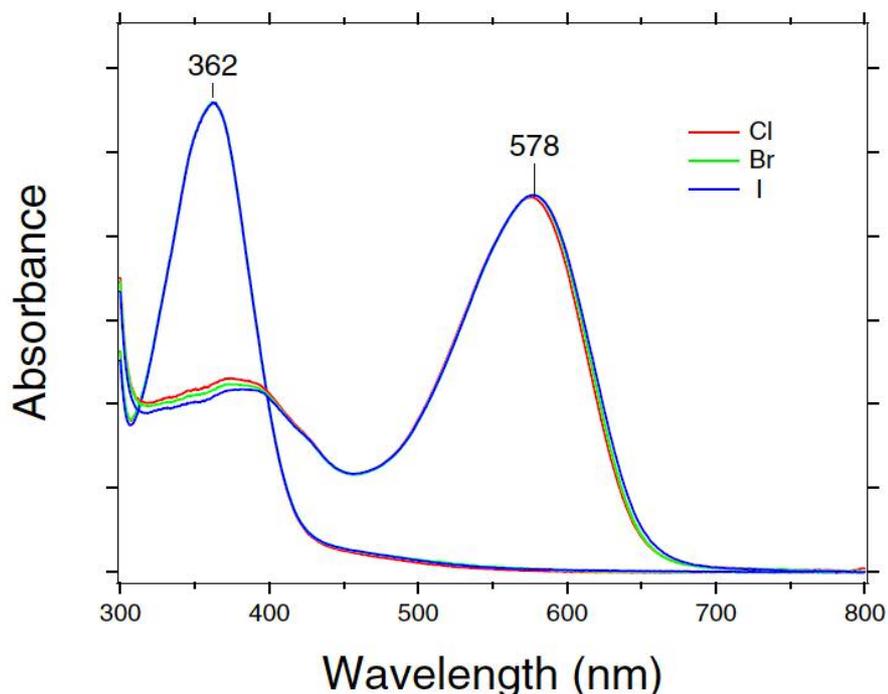
Supporting Information

Ultrafast Pump-Probe Study of the Primary Photoreaction
Process in *pharaonis* Halorhodopsin:
Halide-Ion Dependence and Isomerization Dynamics

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Figure S1



In the present study, the formation of the K-intermediate was observed as the long-lived component in the ground-state recovery dynamics, and the halide-ion dependence of the relative isomerization yield was evaluated from its amplitude. In this evaluation, it was assumed that the extinction coefficient of the all-*trans* form in the three *pHR* does not depend on the halide ion. The validity of this assumption was checked by the following experiment: The retinyl chromophore of *pHR* was converted into retinal oxime by adding hydroxylamine to the sample solution. Because retinal oxime is detached from *pHR*, the halide-ion dependence is ignorable in the absorption spectra of the retinal oxime. Thus, the absorption spectra of retinal oxime obtained from *pHR-Cl*⁻, *pHR-Br*⁻ and *pHR-I*⁻ could be normalized at the peak position (362 nm), as shown in Figure S1. Using the coefficients obtained from this normalization, we normalized the spectra of *pHR-Cl*⁻, *pHR-Br*⁻ and *pHR-I*⁻ to compare the extinction coefficients of retinyl chromophores. The normalized absorption spectra (peaked at 578 nm) of *pHR-Cl*⁻, *pHR-Br*⁻ and *pHR-I*⁻ are also shown in Figure S1. The spectral intensity and band width did not show any noticeable difference within experimental accuracy, which assured that the halide-ion dependence is ignorable in the extinction coefficient of the all-*trans* form in the ground state.