

Supplementary Material

Protein conformational alterations induced by retinal excited state in proton and sodium pumping rhodopsins

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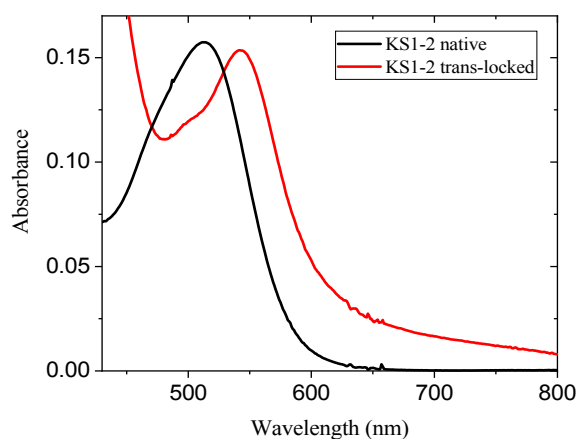


Fig. S1. The absorption maxima of the native and an artificially locked pigment of KS1-2.

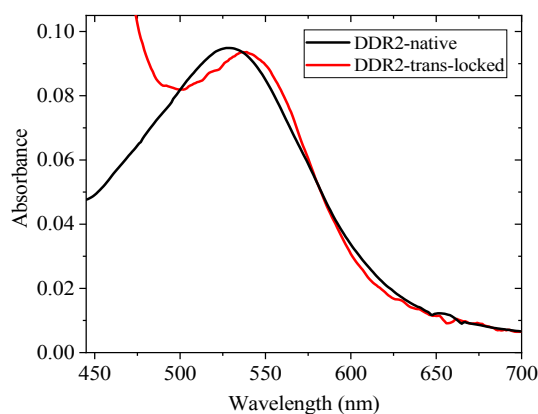


Fig. S2. The absorption maxima of the native and an artificially locked pigment of DDR2.

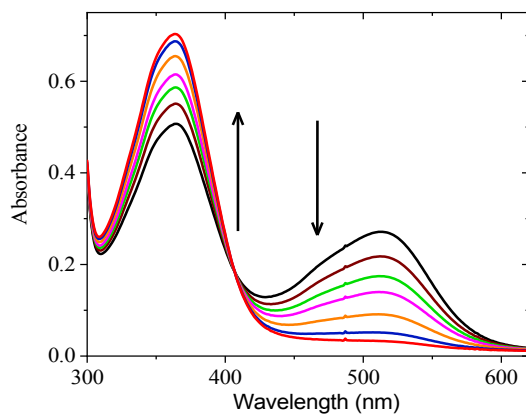


Fig. S3. The absorption spectra of the hydroxylamine reaction with the KS1-2 pigment at different time intervals.

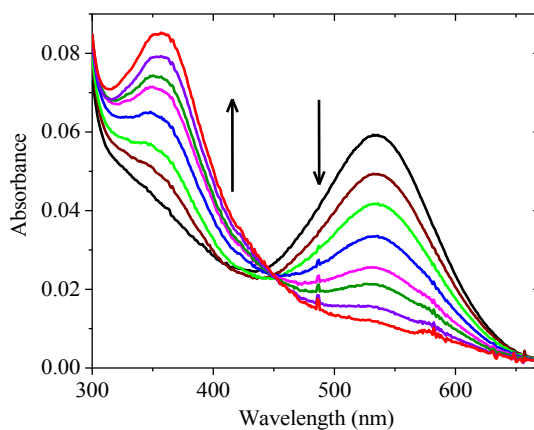


Fig. S4. The absorption spectra of the hydroxylamine reaction with the DDR2 pigment at different intervals.

Table S1: Rate constant (k) values of the hydroxylamine reaction kinetics of native and artificial KS1-2 and DDR2 pigments at different temperatures.

KS1-2	Light	Dark	KS1-2- <i>trans</i> -locked	Light	Dark
	k (s ⁻¹)	k (s ⁻¹)		k (s ⁻¹)	k (s ⁻¹)
15 ^o C	6.35 ×10 ⁻³	8.26 ×10 ⁻⁴	15 ^o C	1.15 ×10 ⁻³	5.76 ×10 ⁻⁵
20 ^o C	9.03 ×10 ⁻³	1.22 ×10 ⁻³	20 ^o C	1.91 ×10 ⁻³	8.74 ×10 ⁻⁵
25 ^o C	9.25 ×10 ⁻³	1.84 ×10 ⁻³	25 ^o C	2.44 ×10 ⁻³	1.44 ×10 ⁻⁴
30 ^o C	1.35 ×10 ⁻²	2.82 ×10 ⁻³	30 ^o C	3.01 ×10 ⁻³	2.49 ×10 ⁻⁴
35 ^o C	1.82 ×10 ⁻²	3.67 ×10 ⁻³	35 ^o C	3.44 ×10 ⁻³	4.16 ×10 ⁻⁴
40 ^o C	1.98 ×10 ⁻²	5.38 ×10 ⁻³	40 ^o C	5.04 ×10 ⁻³	6.46 ×10 ⁻⁴
45 ^o C	2.61 ×10 ⁻²	7.04 ×10 ⁻³	45 ^o C	5.07 ×10 ⁻³	1.03 ×10 ⁻³
DDR2			DDR2- <i>trans</i> -locked		
15 ^o C	3.11 ×10 ⁻³	-	15 ^o C	-	-
20 ^o C	3.48 ×10 ⁻³	2.21 ×10 ⁻⁵	20 ^o C	-	-
25 ^o C	4.56 ×10 ⁻³	2.85 ×10 ⁻⁵	25 ^o C	5.28 ×10 ⁻⁴	1.31 ×10 ⁻⁶
30 ^o C	4.85 ×10 ⁻³	6.70 ×10 ⁻⁵	30 ^o C	7.37 ×10 ⁻⁴	3.71 ×10 ⁻⁶
35 ^o C	5.29 ×10 ⁻³	2.56 ×10 ⁻⁴	35 ^o C	7.88 ×10 ⁻⁴	2.55 ×10 ⁻⁵
40 ^o C	6.05 ×10 ⁻³	5.79 ×10 ⁻⁴	40 ^o C	8.58 ×10 ⁻⁴	6.62 ×10 ⁻⁵
45 ^o C	6.18 ×10 ⁻³	9.24 ×10 ⁻⁴	45 ^o C	1.61 ×10 ⁻³	1.38 ×10 ⁻⁴
50 ^o C	6.59 ×10 ⁻³	1.97 ×10 ⁻³	50 ^o C	3.14×10 ⁻³	3.81 ×10 ⁻⁴