

**Supplementary Table S1.**  $^{13}\text{C}$  chemical shift values of retinal chromophores in microbial rhodopsin#

Rhodopsin	Configuration	Chemical shift / ppm	
		20- $^{13}\text{C}$	14- $^{13}\text{C}$
MR†	13- <i>trans</i> , 15- <i>anti</i>	14.6	124.5
	13- <i>cis</i> , 15- <i>syn</i>	23.0	116.1
BR <sup>a</sup>	13- <i>trans</i> , 15- <i>anti</i>	15.1	125.1
	13- <i>cis</i> , 15- <i>syn</i>	24.2	112.0
<i>SrSRI</i> <sup>b</sup>	13- <i>trans</i> , 15- <i>anti</i>	15.8	-
KR2 <sup>c</sup>	13- <i>trans</i> , 15- <i>anti</i>	16.2	122.5
<i>NpSRII</i> <sup>d</sup>	13- <i>trans</i> , 15- <i>anti</i>	15.5	123.5
ASR <sup>e</sup>	13- <i>trans</i> , 15- <i>anti</i>	16.6	-

†: This work

#: All  $^{13}\text{C}$  chemical shift values were re-calibrated using the reference of DSS.

References: a [24]. b [33]. c [40]. d [32]. e [26].