SUPPORTING INFORMATION

Synthesis and spectroscopic properties of carotenoid bis-phenylhydrazone astaxanthin: Extending conjugation to a C=N group

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Figure S10: Relaxed ground state structures of **Asx** (top) and **BPH-Asx** (bottom). The atoms forming the dihedral angle are shown in cyan. 11

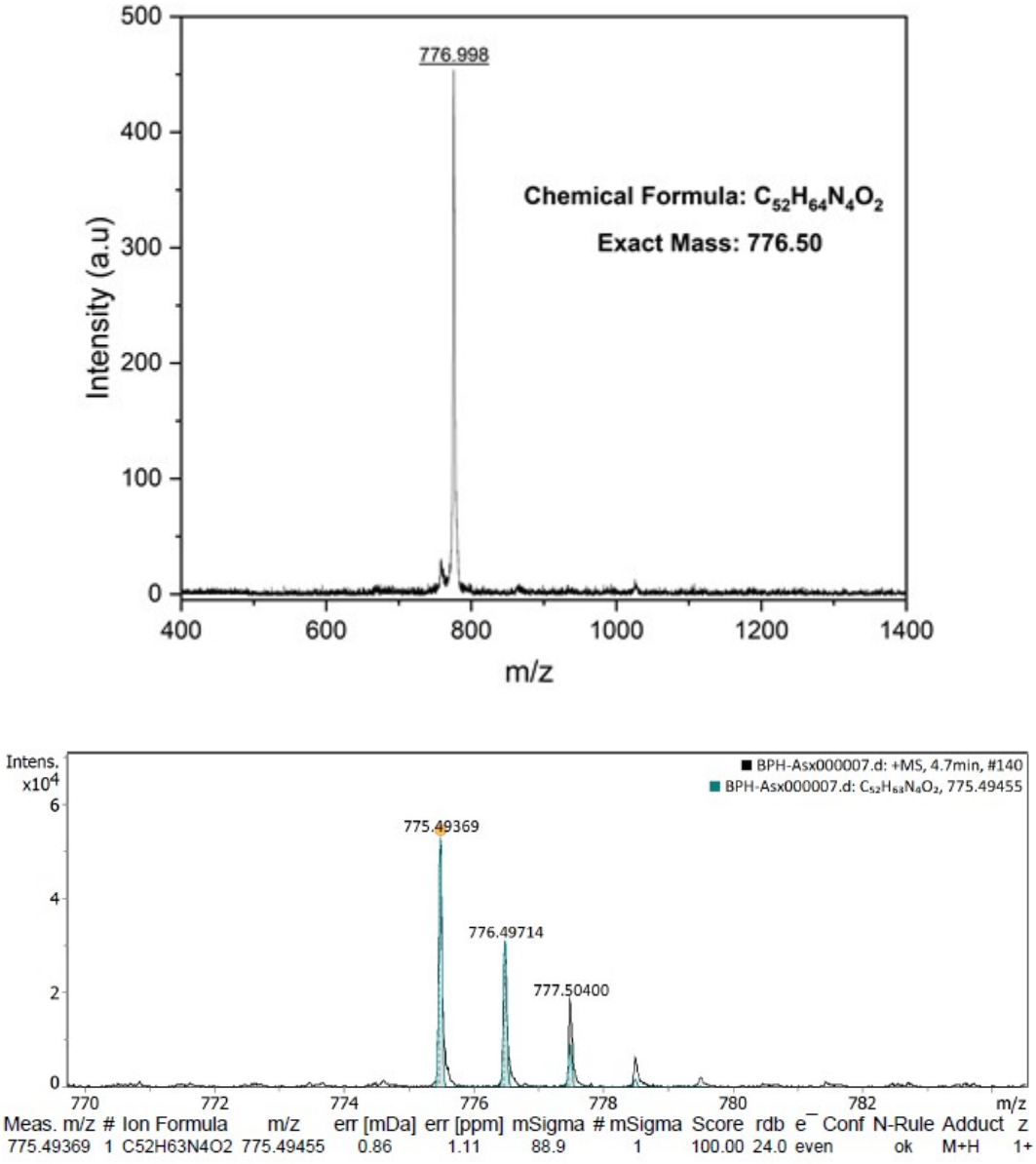


Figure S1: Top: Positive ion and linear mode MALDI TOF-MS spectrum of **BPH-Asx**. Bottom: ESI-MS Spectrum of **BPH-Asx** demonstrating difference between experimental and calculated mass of 1.1 ppm.

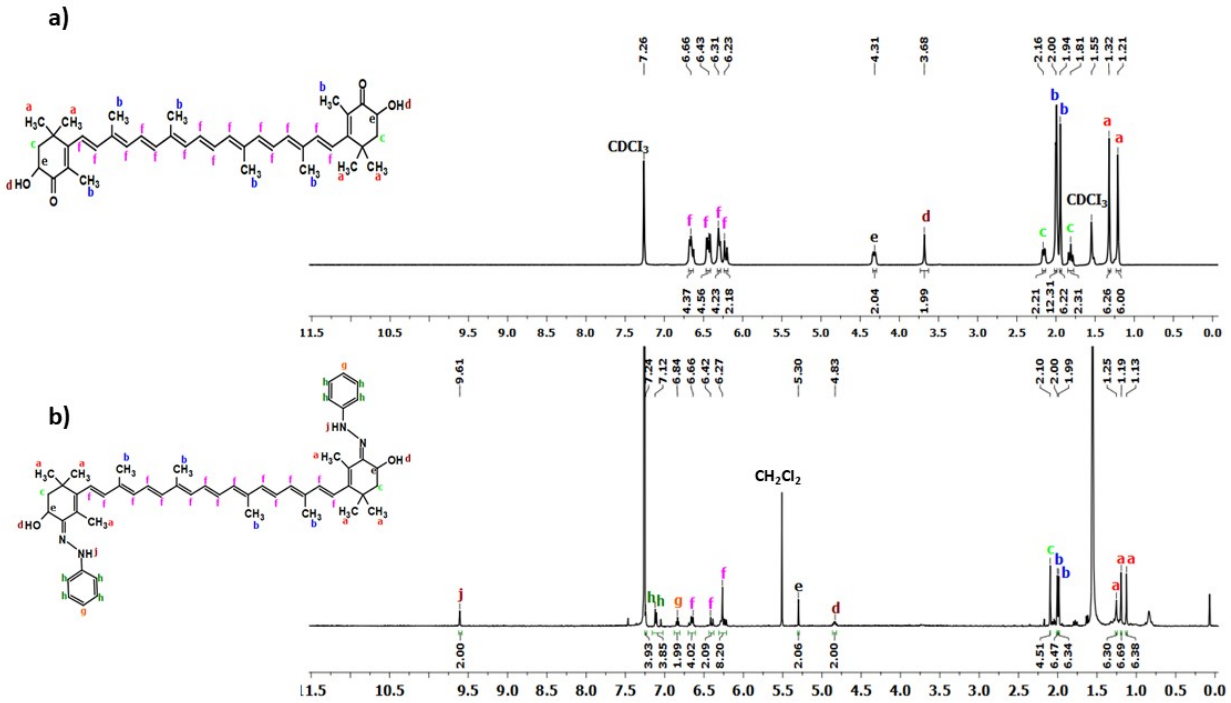


Figure S2: ^{1}H NMR Spectrum of a) **Asx** b) **BPH-Asx** in $CDCl_3$.

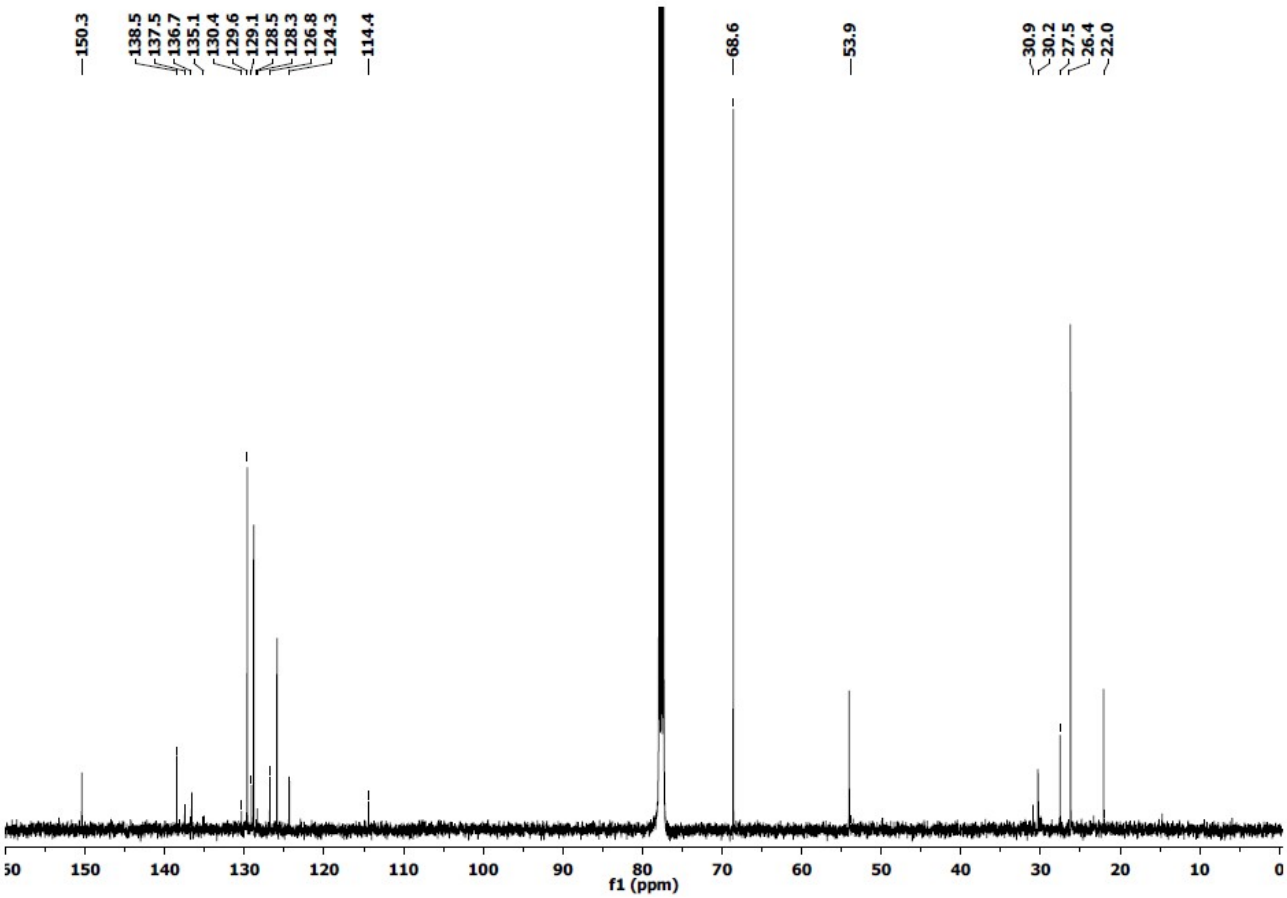


Figure S3: ^{13}C NMR Spectrum of **BPH-Asx** in $CDCl_3$.

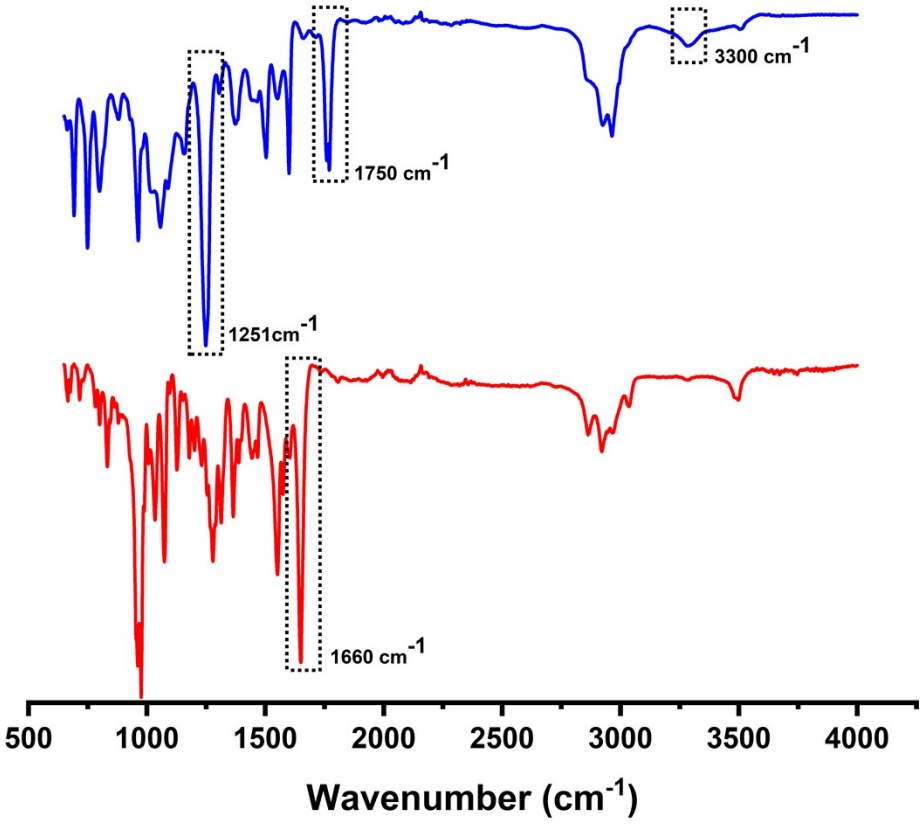
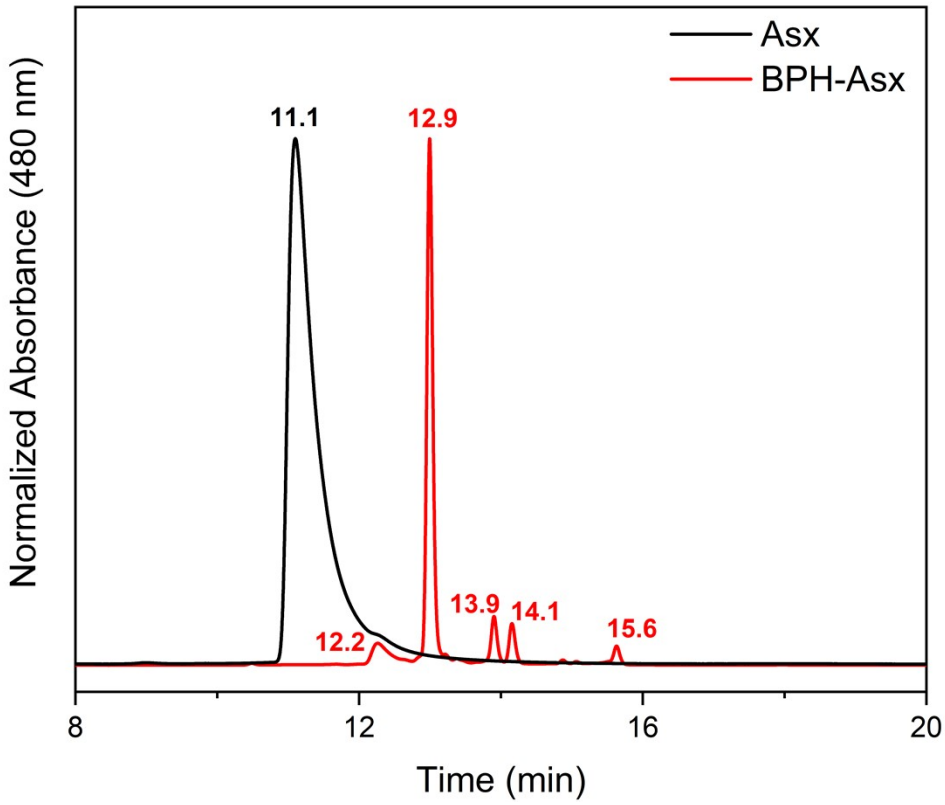


Figure S4: FT-IR Spectrum of **Asx** (red) and **BPH-Asx** (blue).



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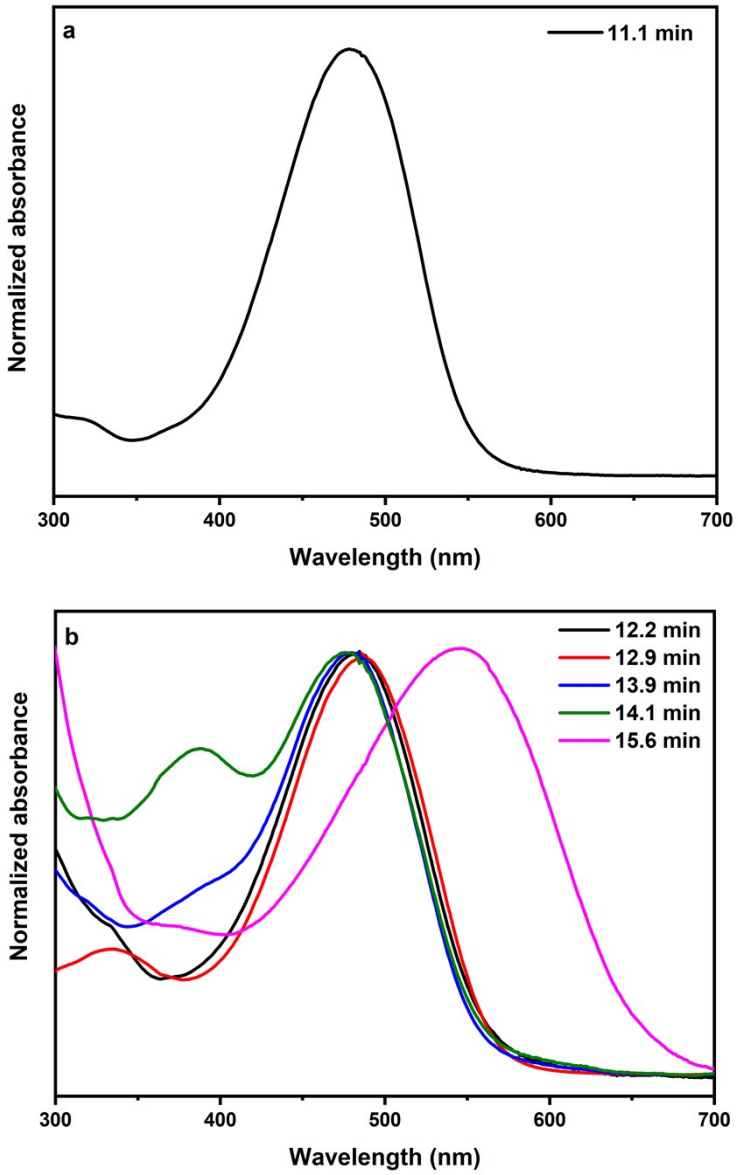

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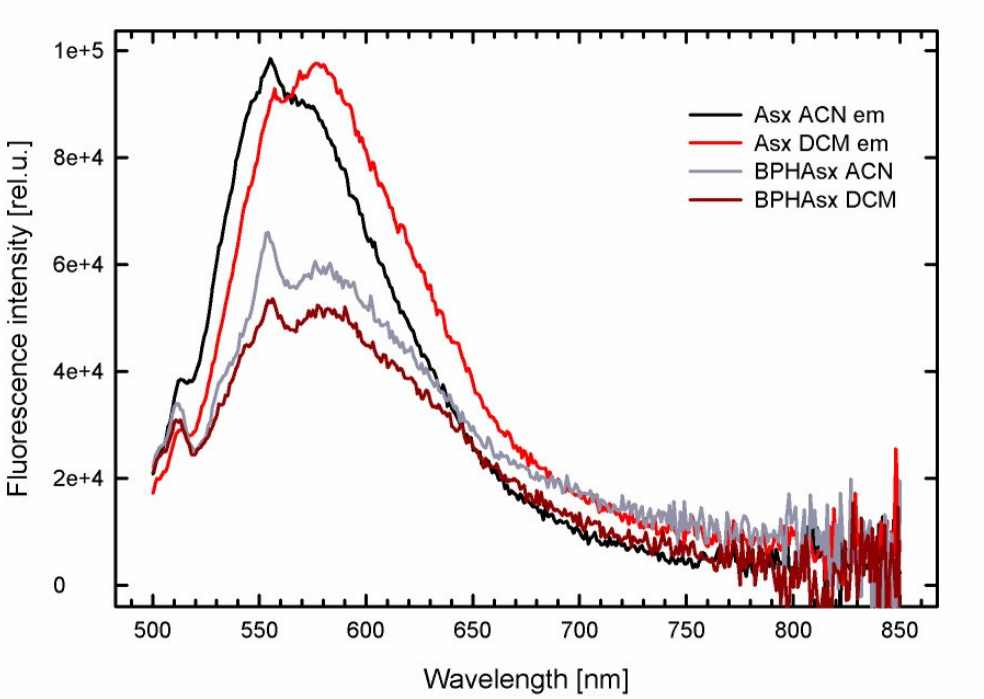


Figure S7. Fluorescence spectra of **Asx** And **BPH-Asx** in DCM and ACN. The sharp peaks are due to Raman bands. The spectra were measured with 5 nm bandpass and were corrected for instrument response. All spectra were excited at 475 nm, absorbance of the samples at this wavelength was 0.4-0.8 (3 mm path length), and the data are normalized to equal absorption at 475 nm.

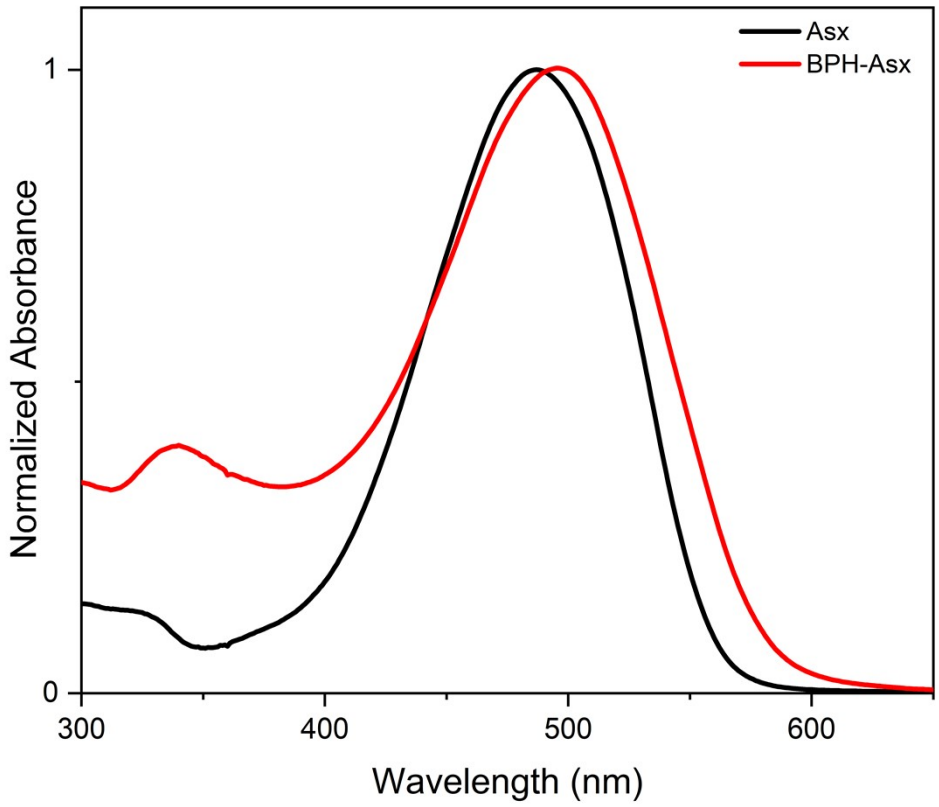
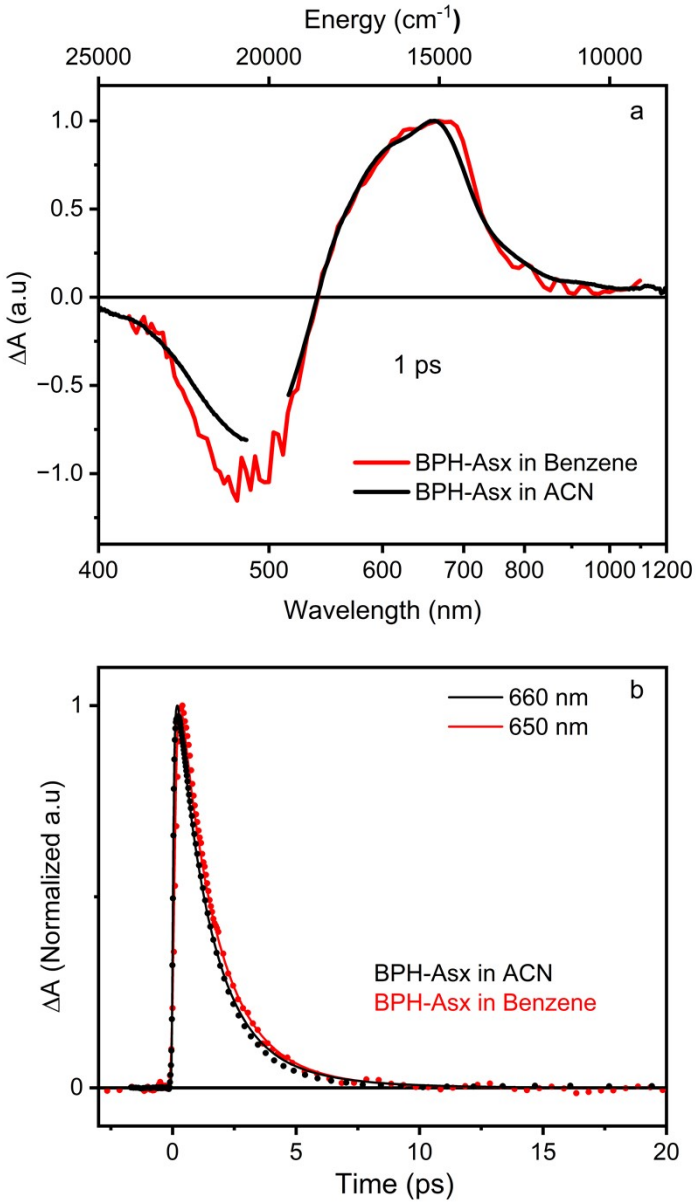


Figure S8. Steady state absorption spectra of astaxanthin (**Asx**) and **BPH-Asx** in benzene.



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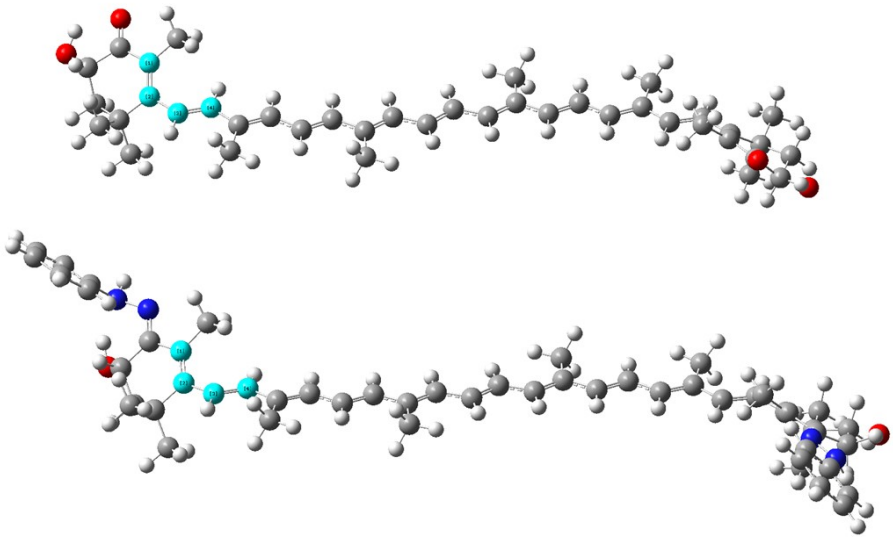

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