

## Supporting Information

### Molecular-Level Composition and Acute Toxicity of Photosolubilized Petrogenic Carbon

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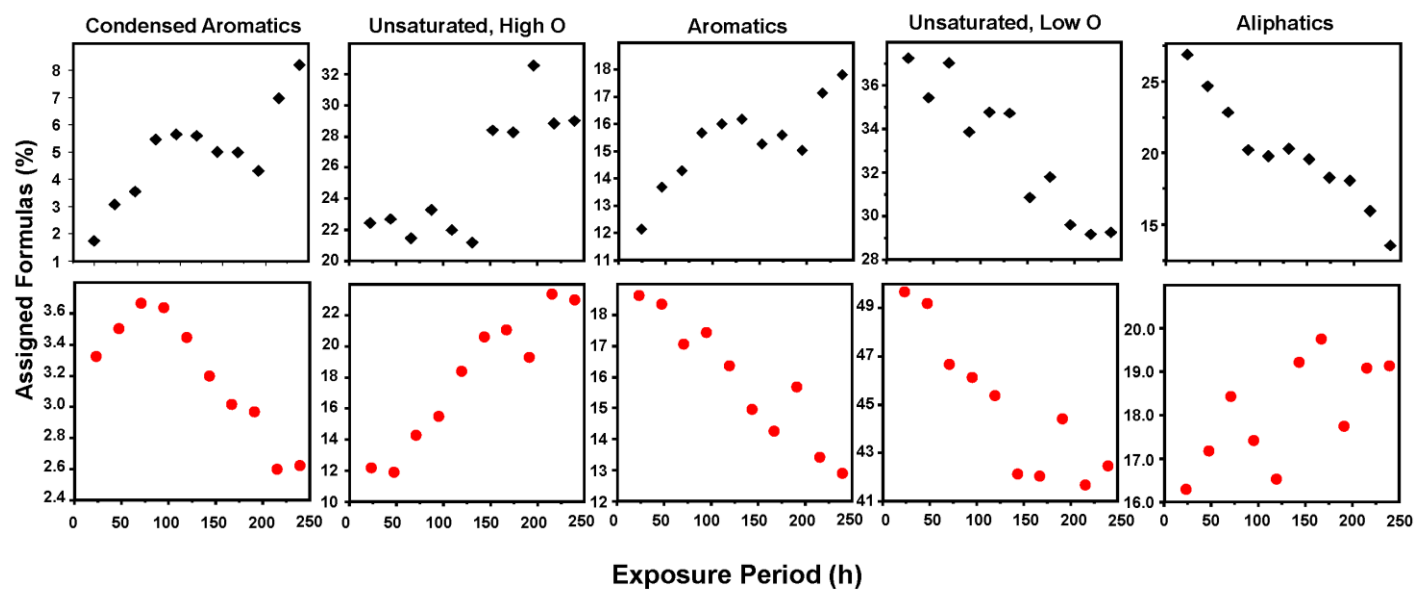
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3 Figures

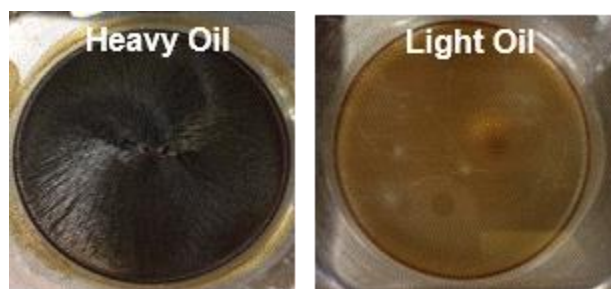
1 Table

	Exposure Period	C1	C2	C3	C4	C5	C6	DOC (mg/L)	HIX	Aliphatic	Unsaturated, Low O	Unsaturated, High O	Condensed Aromatics	Aromatics	SUVA (L mgC <sup>-1</sup> m <sup>-1</sup> )	Acute Toxicity per Unit Carbon
Light DOM <sub>HC</sub>	0	4.6	61.8	16.1	6.9	9.6	1.0	7.2	0.2	24.5	33.2	29.2	1.2	12.0	0.6	51.9
	24	14.5	13.7	41.3	17.5	9.6	3.4	59.5	1.3	16.3	49.7	12.1	3.3	18.6	2.3	63.8
	48	14.4	8.6	34.9	17.4	20.4	4.2	97.4	1.0	17.2	49.1	11.9	3.5	18.3	3.5	52.3
	72	21.2	6.3	17.6	15.9	32.0	7.0	127.4	0.9	18.4	46.6	14.2	3.7	17.1	2.8	33.0
	96	22.6	4.3	10.9	13.9	40.2	8.1	189.3	0.8	17.4	46.1	15.5	3.6	17.4	1.5	19.0
	120	27.6	2.1	4.0	11.5	42.7	12.0	189.9	1.0	16.5	45.3	18.4	3.4	16.3	1.9	13.8
	144	28.5	1.5	4.4	11.9	43.0	10.8	207.1	1.0	19.2	42.1	20.6	3.2	14.9	1.9	14.5
	168	30.3	0.9	1.3	10.5	47.0	9.9	207.1	1.0	19.7	42.0	21.0	3.0	14.2	1.8	14.6
	192	29.5	4.5	3.9	11.2	45.5	5.4	221.7	0.8	17.7	44.4	19.3	3.0	15.7	2.9	12.8
	216	31.8	0.0	0.0	8.3	49.6	10.3	255.6	1.0	19.1	41.6	23.3	2.6	13.4	1.3	14.2
	240	32.4	0.0	0.0	7.4	50.0	10.2	234.2	1.0	19.1	42.4	22.9	2.6	12.9	1.7	11.8
Heavy DOM <sub>HC</sub>	0	1.8	35.8	29.6	12.8	19.1	0.9	10.4	0.3	29.1	37.8	22.3	1.7	9.1	2.0	73.1
	24	22.6	28.1	22.1	13.7	9.9	3.7	42.5	1.0	26.6	35.8	22.6	3.1	12.0	2.2	52.1
	48	25.6	11.3	33.3	12.2	9.7	7.9	76.6	2.1	24.5	37.5	21.3	3.5	13.1	3.7	33.5
	72	18.9	22.0	33.0	14.5	4.8	6.8	36.8	1.4	21.5	34.2	23.1	5.5	15.7	3.8	50.4
	96	27.5	8.7	33.6	14.8	3.5	11.9	63.5	3.3	21.1	35.1	21.9	5.6	16.3	5.3	29.1
	120	43.3	10.7	15.2	9.5	10.2	11.2	116.1	3.0	21.6	35.1	21.1	5.6	16.6	4.4	16.4
	144	46.2	6.4	19.8	9.9	3.3	14.4	139.8	5.9	21.6	35.1	21.1	5.6	16.6	5.5	18.9
	168	43.8	5.2	20.5	8.8	7.1	14.6	225.5	5.0	20.8	31.0	28.3	5.0	14.9	3.2	0.0
	192	55.2	3.3	13.2	10.2	8.4	9.7	152.6	5.1	19.3	32.0	28.2	5.0	15.6	2.4	2.6
	216	44.0	4.4	19.0	10.2	7.2	15.3	242.5	5.2	19.1	29.6	32.4	4.3	14.5	2.9	0.0
	240	43.5	6.8	7.4	11.1	20.4	10.8	197.8	2.4	16.7	29.2	28.7	7.0	18.4	1.9	0.0

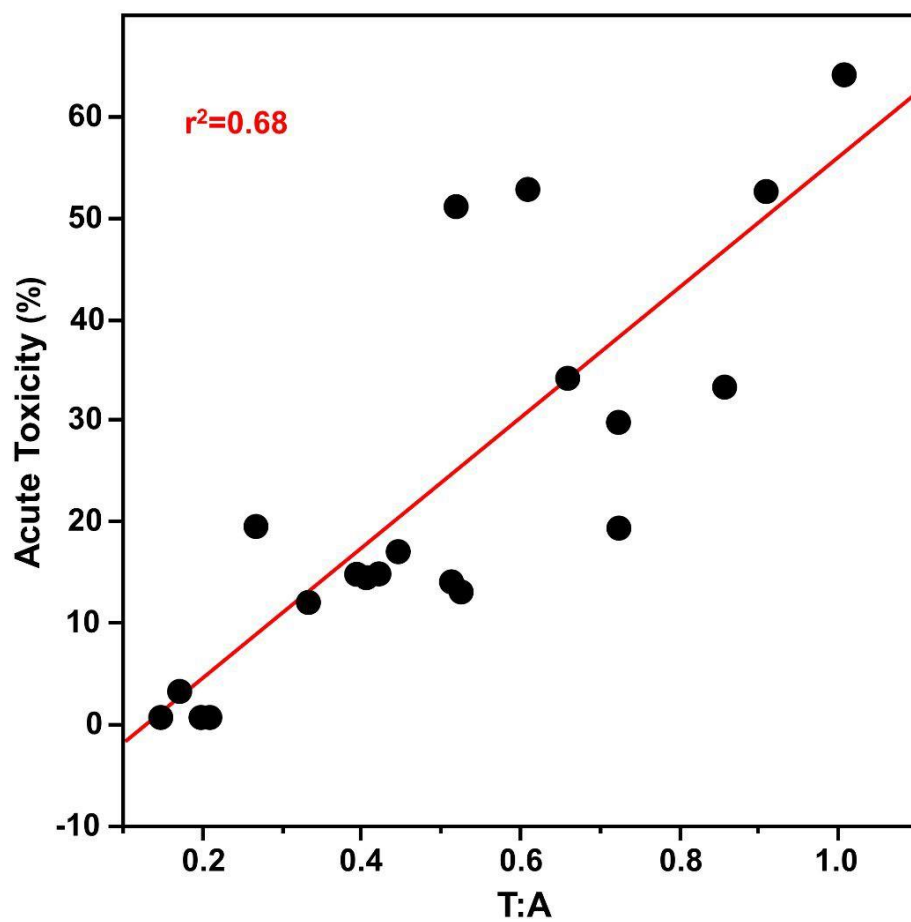
**Table S1.** Dissolved organic carbon concentrations (DOC), PARAFAC loadings (C1 – C6), HIX values, FT-ICR MS data, SUVA<sub>254</sub>, and acute toxicity per unit carbon results for DOM<sub>HC</sub> produced from light and heavy petroleum.



**Figure S1:** FT-ICR MS data versus exposure time for light DOM<sub>HC</sub> (red) and heavy DOM<sub>HC</sub> (black).



**Figure S2:** Top view of thin oil films after prolonged irradiation for heavy oil (left) and light oil (right) in thermostatically controlled jacketed beakers.



**Figure S3:** Toxicity Index (TI) of raw fluorescence of peaks T and A versus percent acute toxicity per unit carbon.