Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Electronic Supporting Information

Dye functionalized-ROMP based terpolymer for the use as a light up-converting material via triplet-triplet annihilation

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Table S1. Preparation list of the stock solutions

	M [g/mol]	m [g]	n [mmol]	Solvent [mL]	Stock solution [g/L]
Matrix	210.23	0.5068	2.4107	5.00	0.10136
PdE	616.75	0.0347	0.0563	2.00	0.01735
Pt TPTBP	1458.77	0.0208	0.0143	2.00	0.01040
M31	747.71	0.0042	0.0056	2.00	0.00210

Table S2. Table for GPC data of the Polymers

Polymer	Mn [g/mol]	Mw [g/mol]	Mz [g/mol]	PDI []
I	580000	662080	745660	1.63
II	81040	92510	104190	1.21
III	81100	92580	104265	1.23
IV	80950	92405	104070	1.16
V	81050	92520	104200	1.14

Table S3. Comparison of UC quantum yields

Polymer	Xe Lamp [%]	Laser [%]	Laser (polymer * 2) [%]
I	0.01	0.06	/
II	0.02	0.16	0.18
III	0.01	0.10	0.08
IV	0.06	0.52	0.35
V	0.43	2.95	2.80

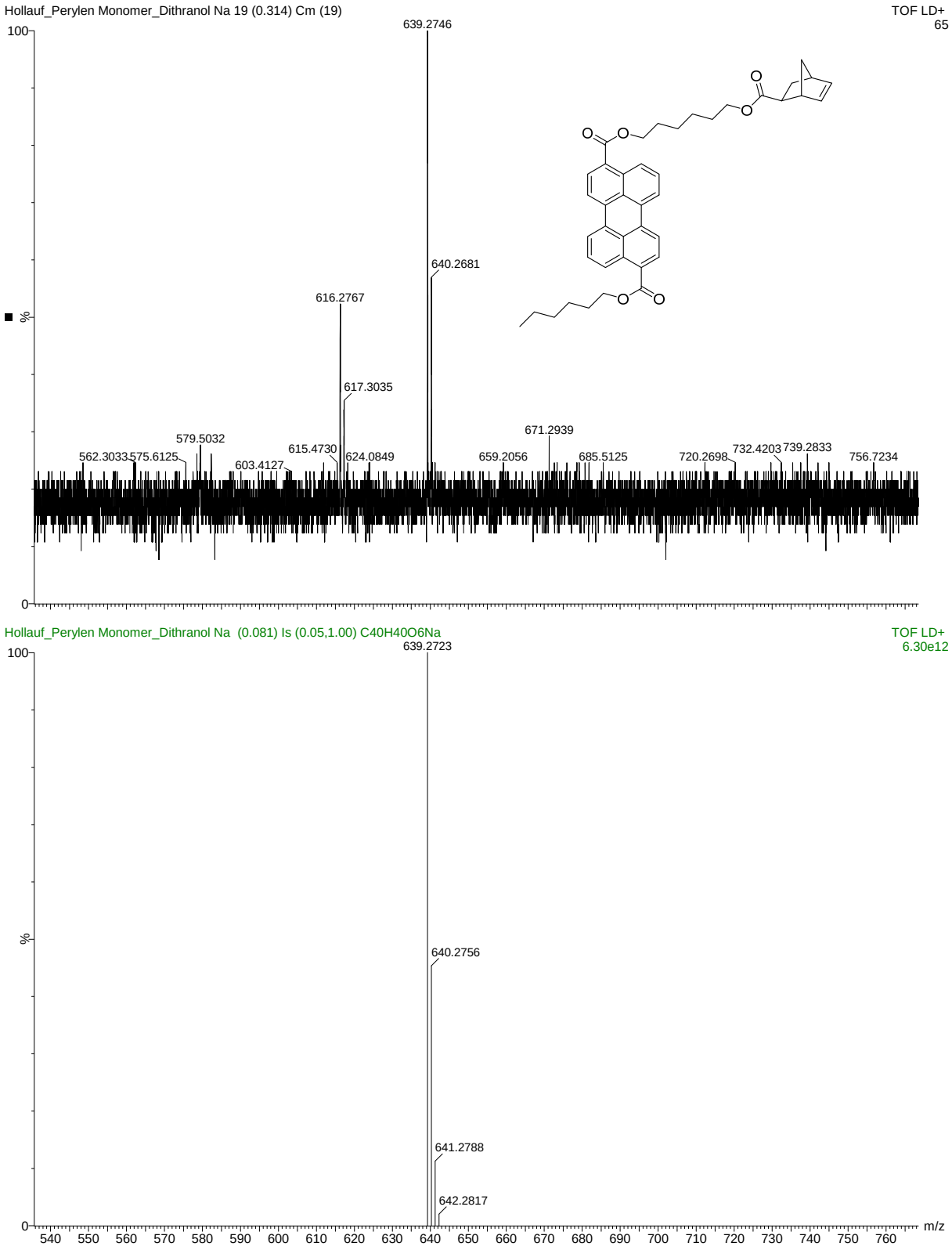

Figure S1. Mass spectrum (MALDI) of **PDE_{mon}**

$C_{40}H_{40}O_6Na$ calculated: 639.2723 g/mol experimental: 639.2746 m/z

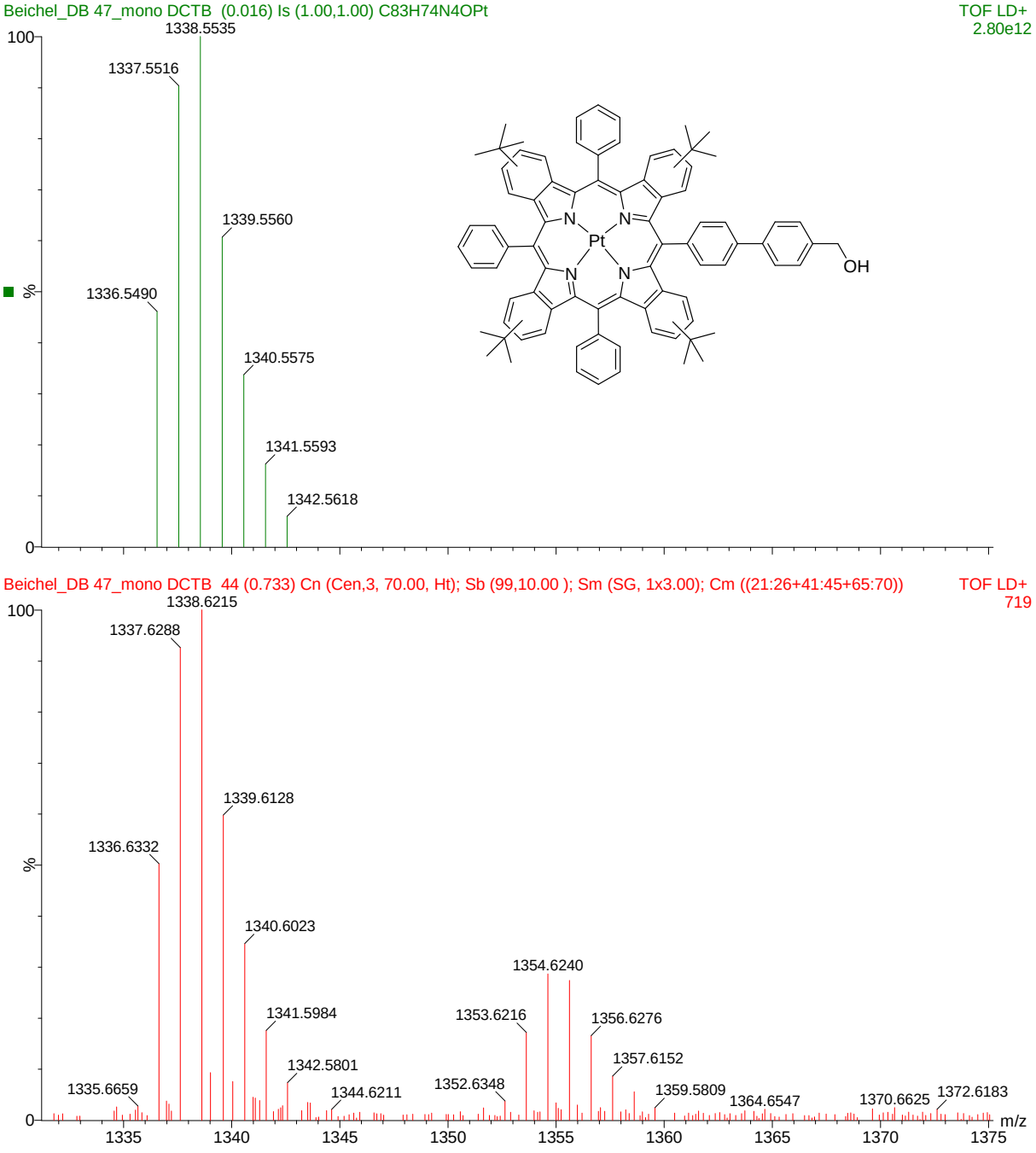

Figure S2. Mass spectrum (MALDI) of **HMP TPTBTBP Pt**

$C_{83}H_{74}N_4O$ calculated: 1338.5535 g/mol experimental: 1338.6215 m/z

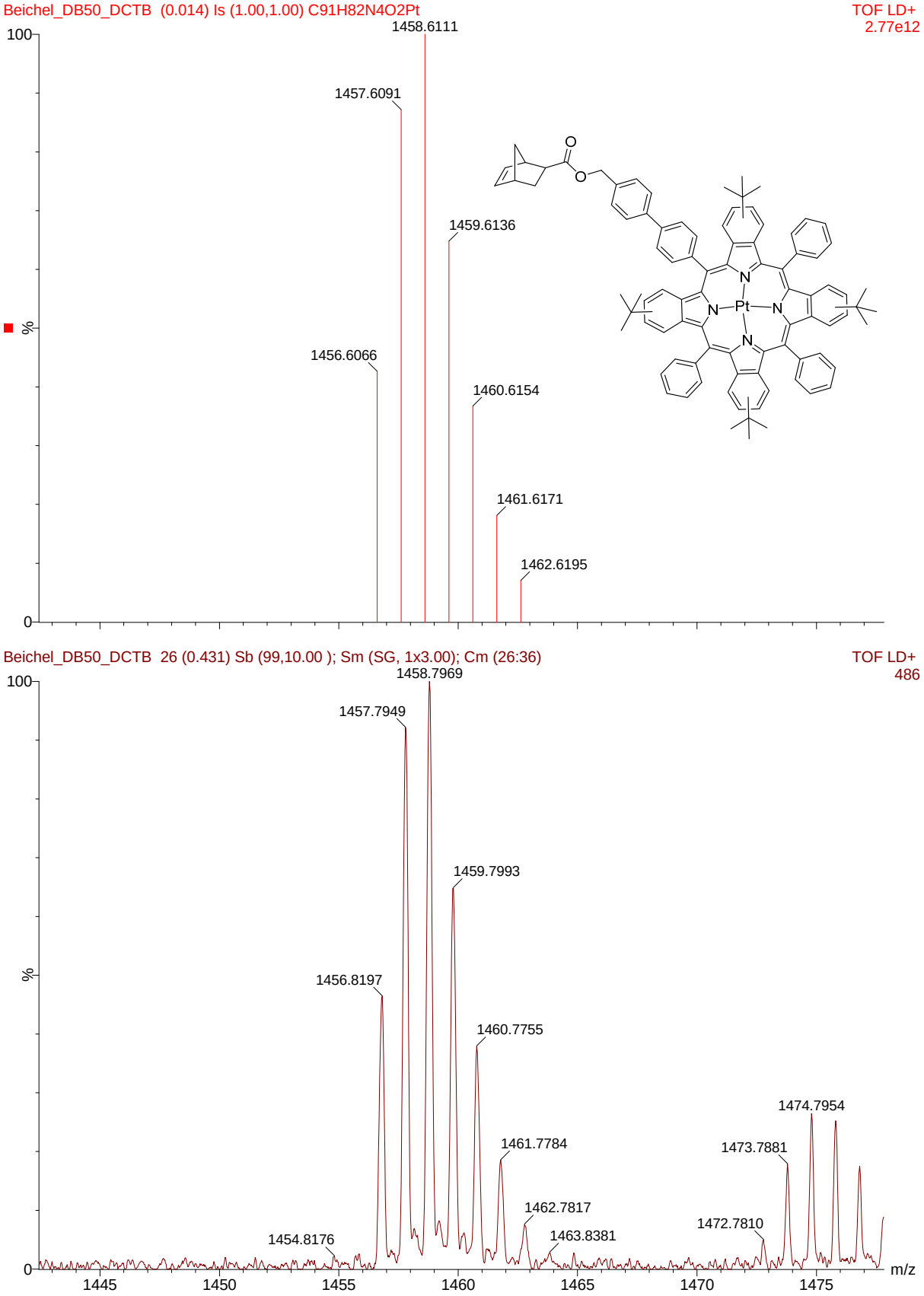

Figure S3. Mass spectrum (MALDI) of **TPTBTBP Pt$_{mon}$**

$C_{91}H_{82}N_4O_2Pt$ calculated: 1458.6111 experimental: 1458.769

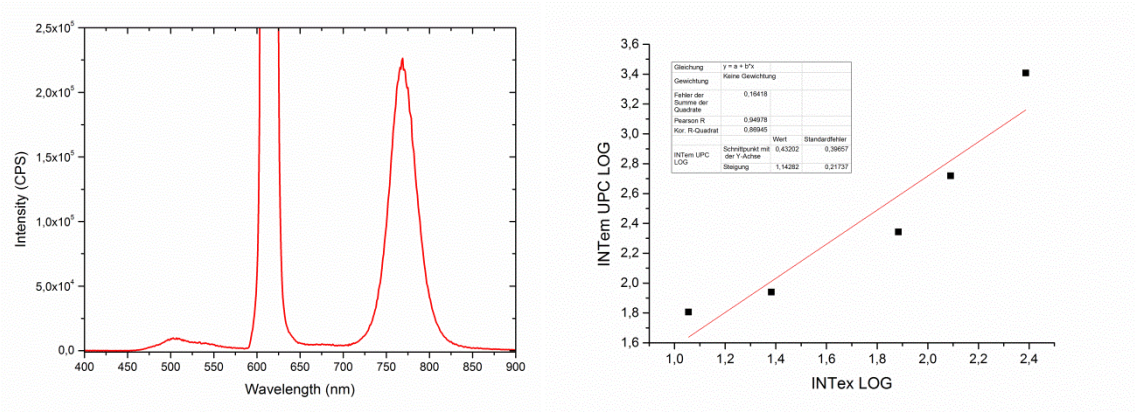

Figure S4. TTA UC emission spectra of polymer **I** and the corresponding double logarithmic plot of energy dependent UC measurements (excitation with a 450W Xe Lamp: 244 µ mol s^{-1} m^{-2})

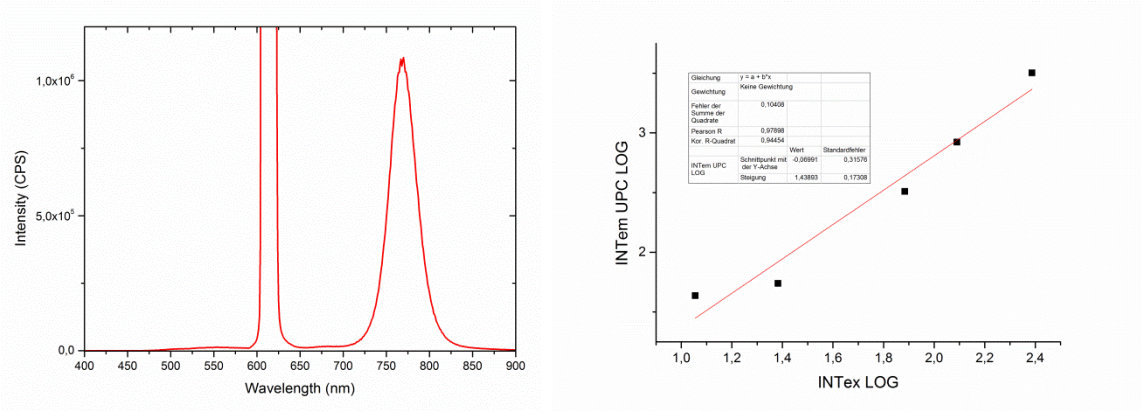

Figure S5. TTA UC emission spectra of polymer **II** and the corresponding double logarithmic plot of energy dependent UC measurements (excitation with a 450W Xe Lamp: 244 µ mol s^{-1} m^{-2})

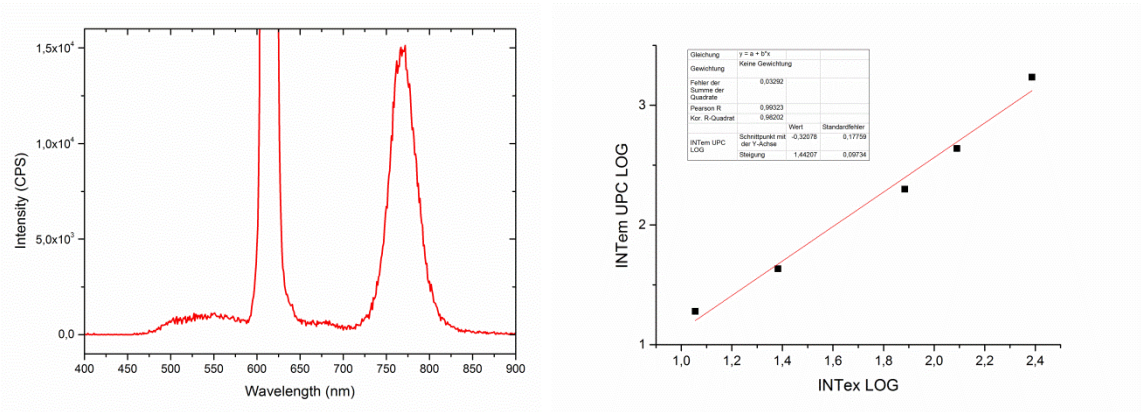

Figure S6. TTA UC emission spectra of polymer **III** and the corresponding double logarithmic plot of energy dependent UC measurements (excitation with a 450W Xe Lamp: 244 µ mol s^{-1} m^{-2})

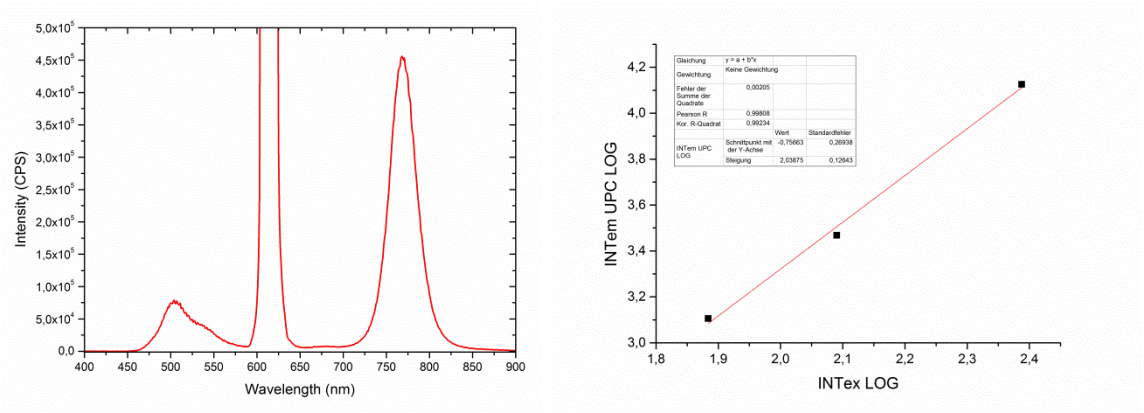

Figure S7. TTA UC emission spectra of polymer **IV** and the corresponding double logarithmic plot of energy dependent UC measurements (excitation with a 450W Xe Lamp: 244 µ mol s^{-1} m^{-2})

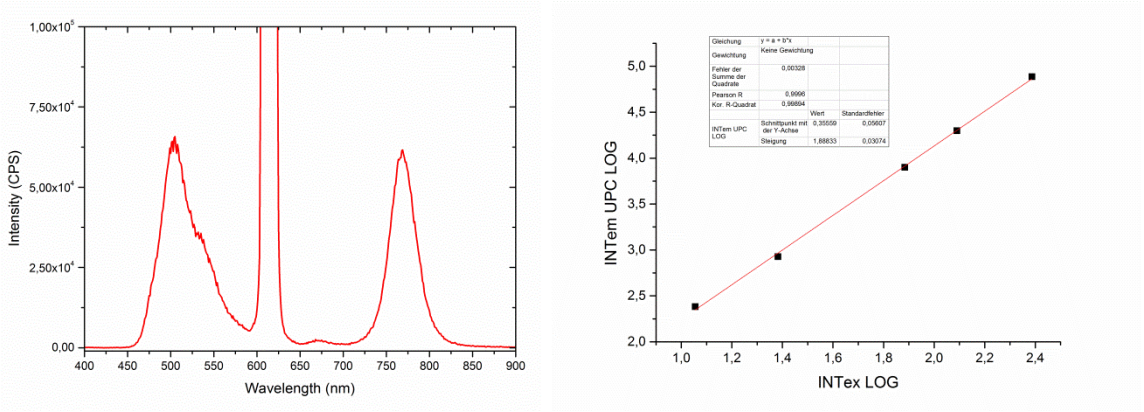

Figure S8. TTA UC emission spectra of polymer **V** and the corresponding double logarithmic plot of energy dependent UC measurements (excitation with a 450W Xe Lamp: 244 µ mol s^{-1} m^{-2})

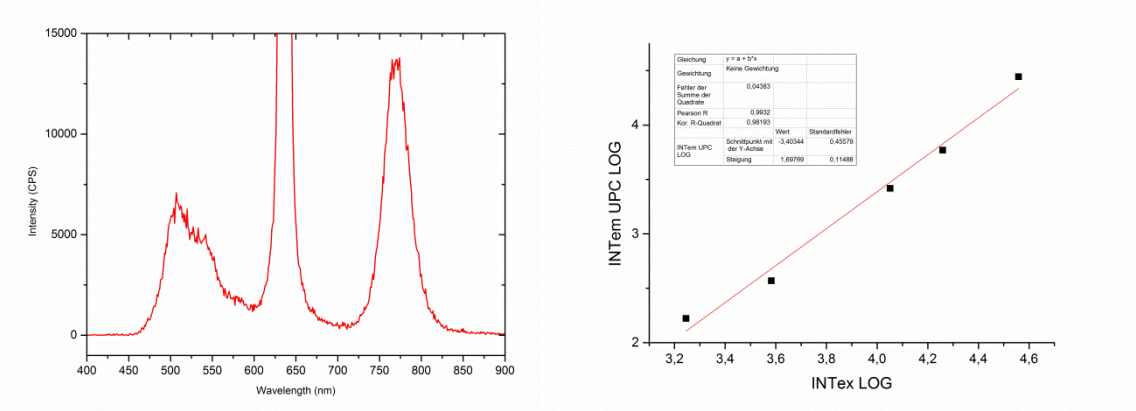

Figure S9. TTA UC emission spectra of polymer **I** and the corresponding double logarithmic plot of energy dependent UC measurements (excitation with a laser diode: 36 200 µ mol s^{-1} m^{-2})

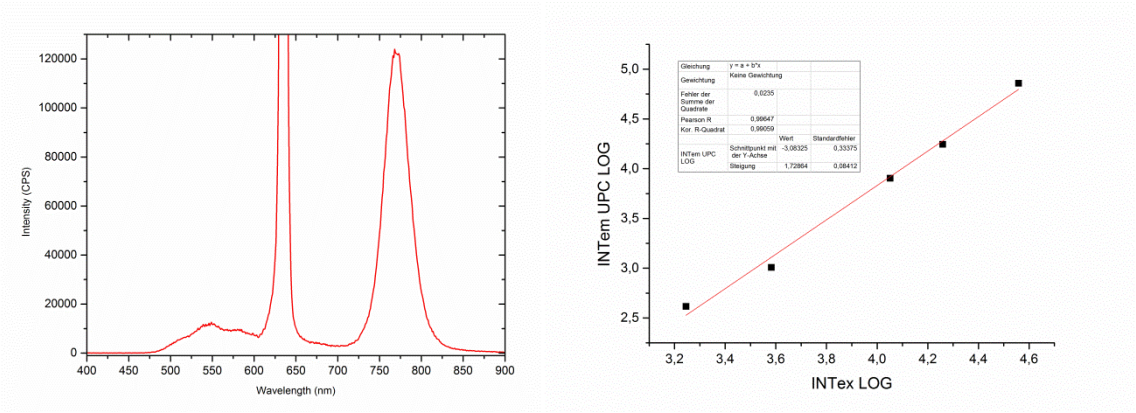

Figure S10. TTA UC emission spectra of polymer **II** and the corresponding double logarithmic plot of energy dependent UC measurements (excitation with a laser diode: 36 200 µ mol s^{-1} m^{-2})

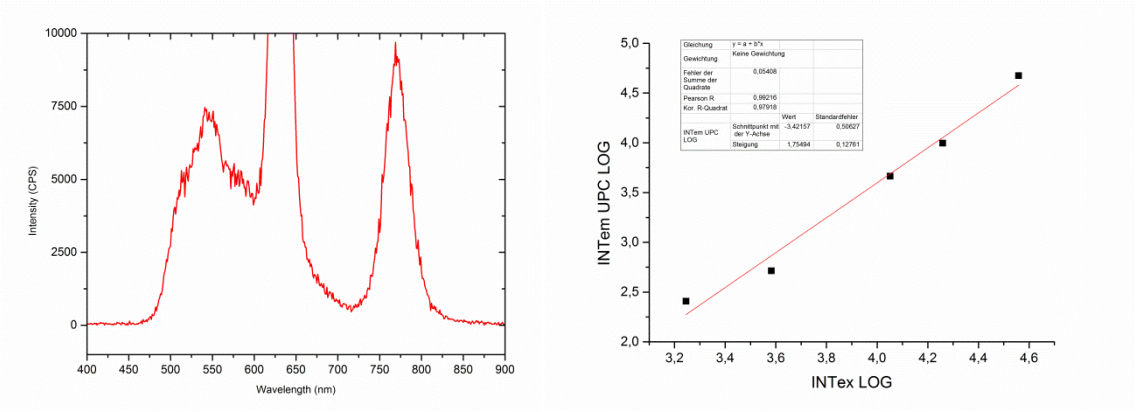

Figure S11. TTA UC emission spectra of polymer **III** and the corresponding double logarithmic plot of energy dependent UC measurements (excitation with a laser diode: 36 200 µ mol s^{-1} m^{-2})

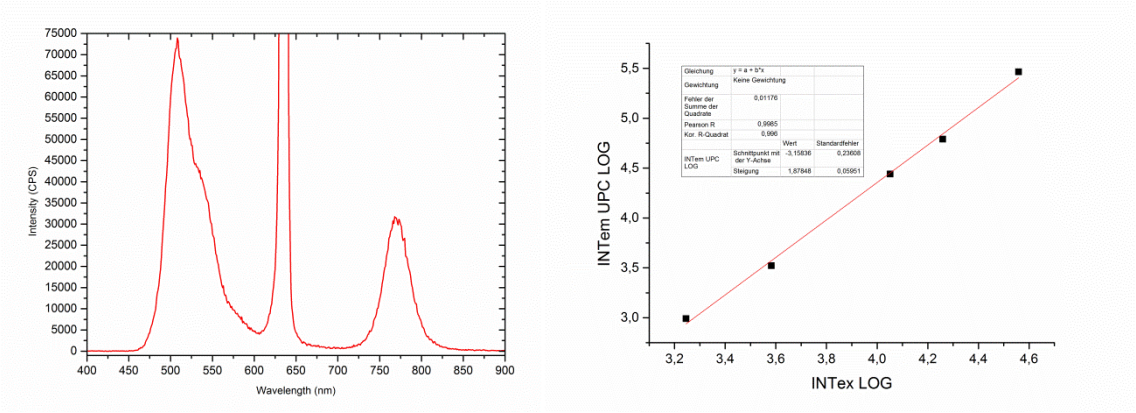

Figure S12. TTA UC emission spectra of polymer **IV** and the corresponding double logarithmic plot of energy dependent UC measurements (excitation with a laser diode: 36 200 µ mol s^{-1} m^{-2})

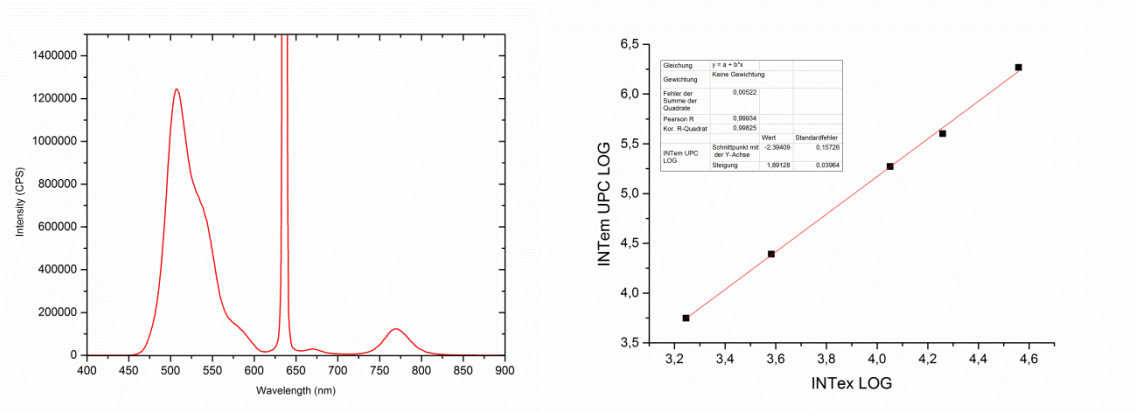

Figure S13. TTA UC emission spectra of polymer **V** and the corresponding double logarithmic plot of energy dependent UC measurements (excitation with a laser diode: 36 200 µ mol s^{-1} m^{-2})

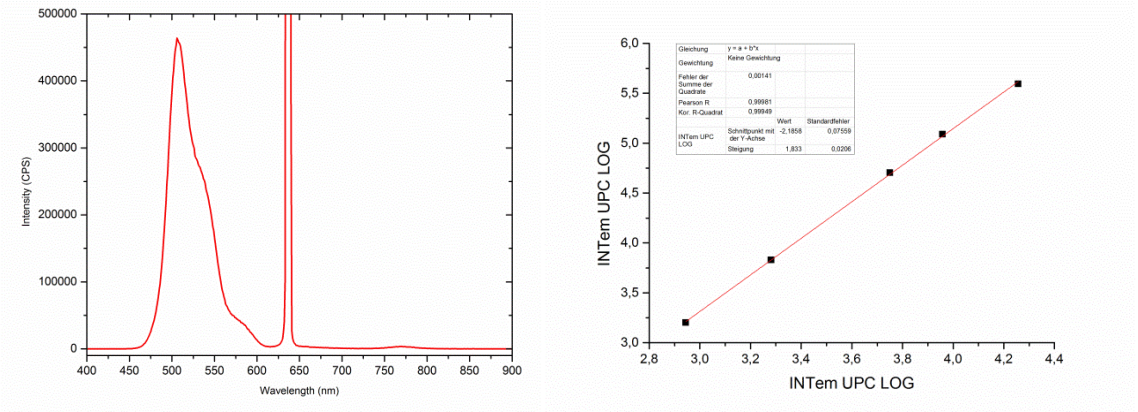

Figure S14. TTA UC emission spectra of a solution of **PDE_{mon}** (c = $5 \bullet 10^{-4}$ M) and **TPTBTBP Pt_{mon}** (c = $1 \bullet 10^{-4}$ M) in 1,4-dioxane and the corresponding double logarithmic plot of energy dependent UC measurements

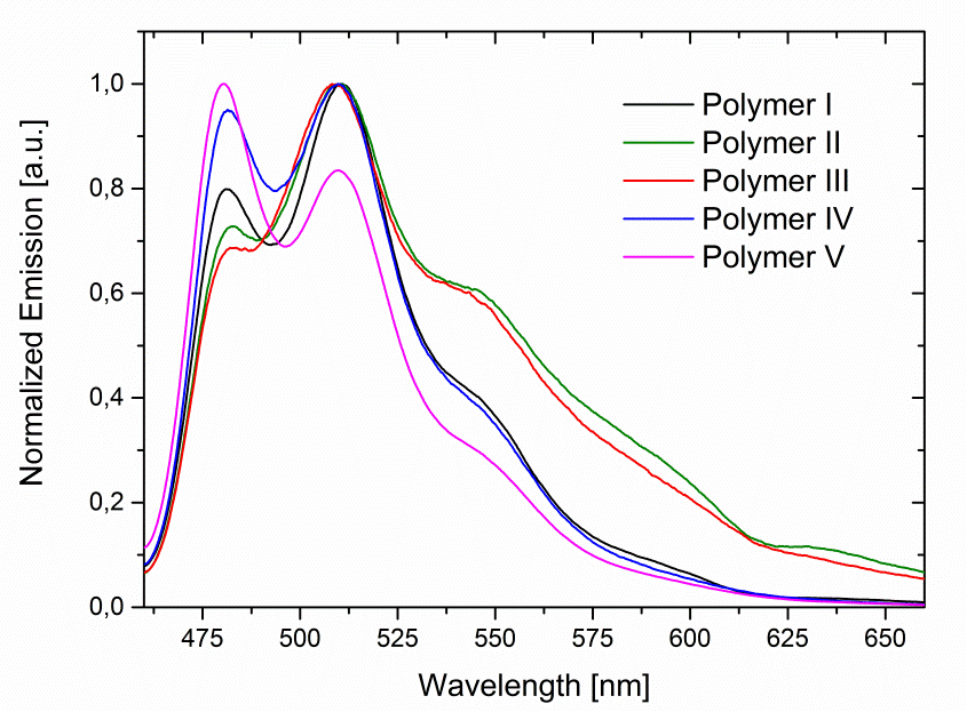

Figure S15: Photoluminescence spectra of polymers **I**-**V** under excitation at λ=430 nm. The broadening and red shift of the perylene emission is typically found upon aggregation caused by π–π stacking of the perylene ring systems. (M. S. Glaz, J. D. Biberdorf, M. T. Nguyen, J. J. Travis, B. J. Holliday and D. A. Vanden Bout, *J. Mater. Chem. C*, 2013, **1**, 8060–8065)