

Thienylphenothiazine Integrated Pyrenes: An Account on the Influence of Substitution Pattern on Optical and Electroluminescent Properties

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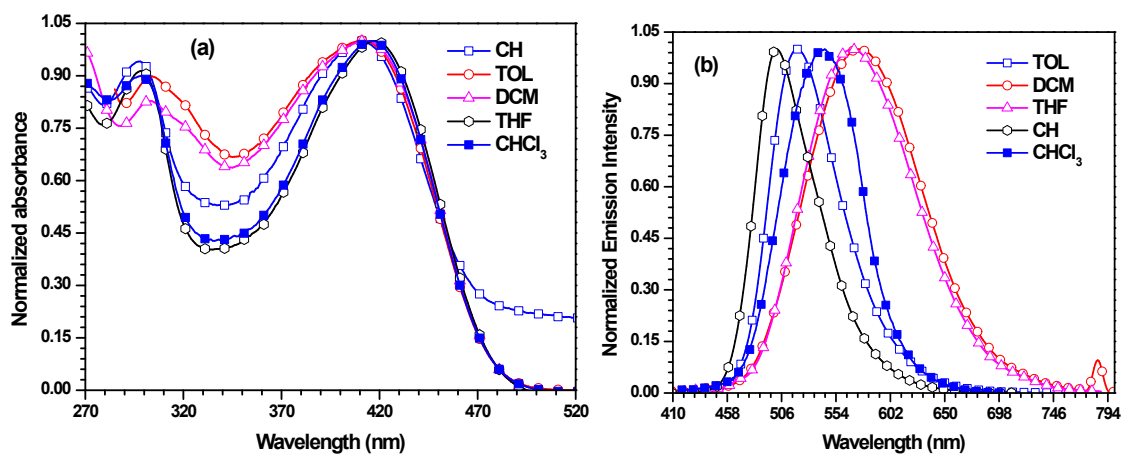


Fig. S1 (a) Absorption and (b) emission spectra of **PP2a** recorded in different solvents.

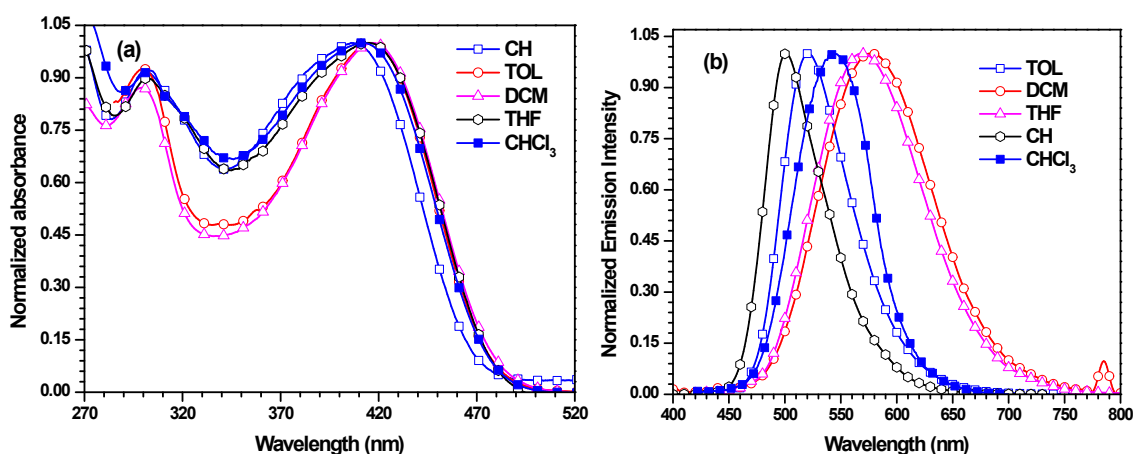


Fig. S2 (a) Absorption and (b) emission spectra of **PP2b** recorded in different solvents.

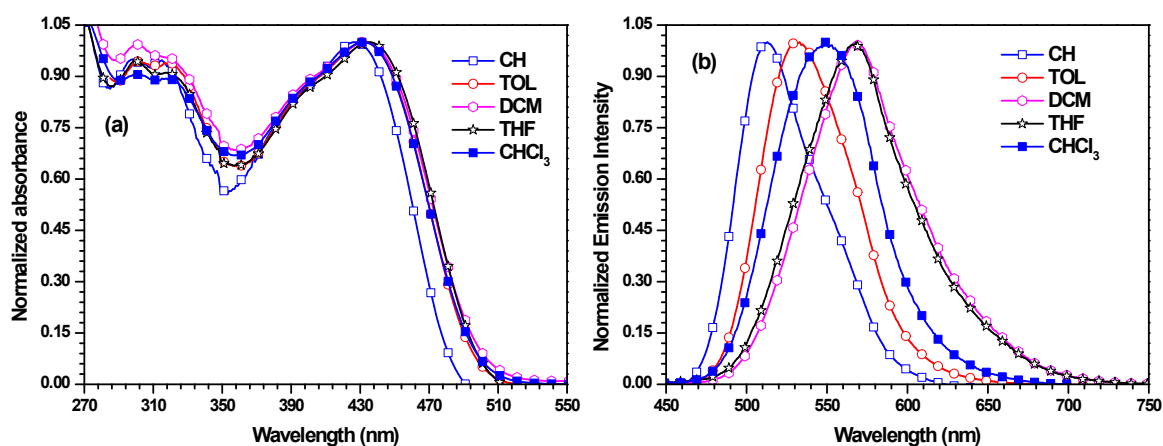


Fig. S3 (a) Absorption and (b) emission spectra of **PP3** recorded in different solvents.

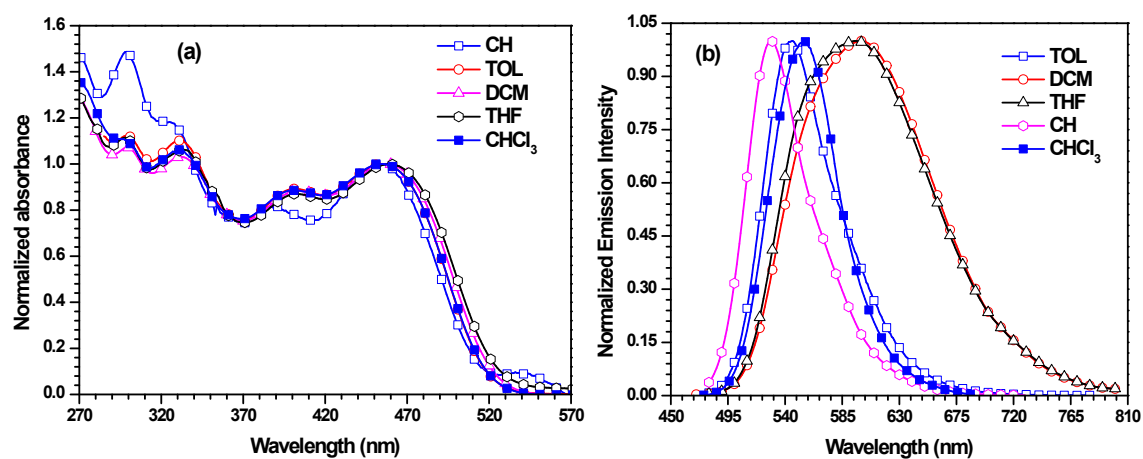


Fig. S4 (a) Absorption and (b) emission spectra of **PP4** recorded in different solvents.

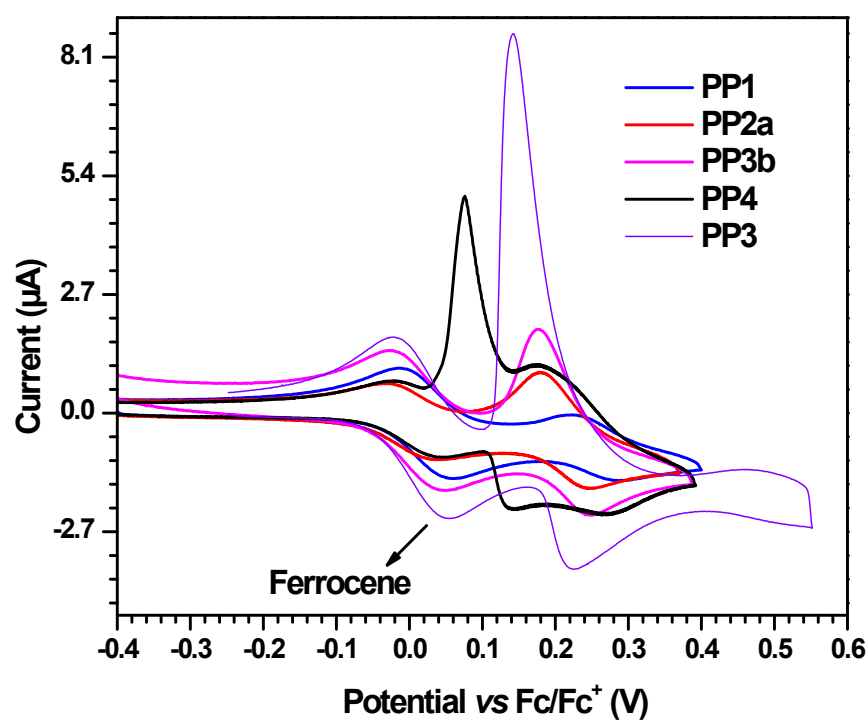


Fig. S5 Cyclic voltammograms of the dyes **PP1-PP4**.

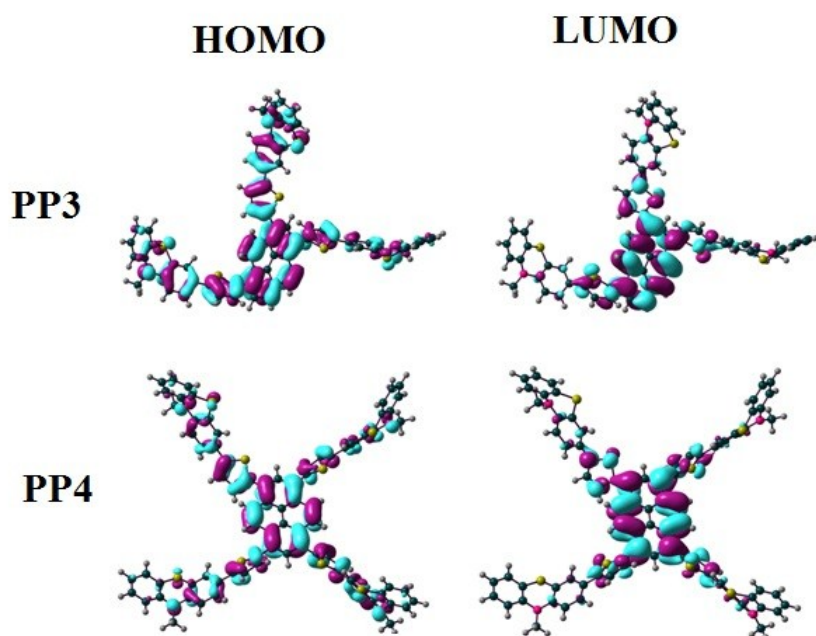


Fig. S6 Frontier molecular orbitals of the dyes **PP3** and **PP4**.

Table S1 Absorption data of the dyes recorded in various solvents.

Dye	λ_{max} (nm)				
	CH	TOL	CHCl ₃	DCM	THF
PP1	377, 276	382, 275	382, 276	382, 277	382, 275
PP2a	412, 297	411, 301	409, 302	412, 302	418, 298
PP2b	406, 301	416, 300	413, 300	417, 298	415, 302
PP3	427, 298	433, 300	432, 299	433, 300	433, 299
PP4	452, 386, 298	456, 402, 331, 299	456, 400, 339, 298	456, 402, 332, 299	459, 402, 334, 298

Table S2 Emission data of the dyes recorded in various solvents with Stokes shift.

Dye	λ_{em} (nm)							Stokes shift (cm ⁻¹)				
	CH	TOL	CHCl ₃	DCM	THF	Δf_{max}	Film	CH	TOL	CHCl ₃	DCM	THF
PP1	484	508	532	557	550	73	528	5864	6493	7381	8088	7996
PP2a	502	520	544	574	569	72	560	4352	5041	6068	6820	6406
PP2b	501	521	545	577	569	76	548	4670	4787	5864	6650	6522
PP3	513	533	549	568	568	55	569	3459	3901	4933	5703	5309
PP4	529	546	555	600	596	71	603	3123	3615	3912	5203	4980

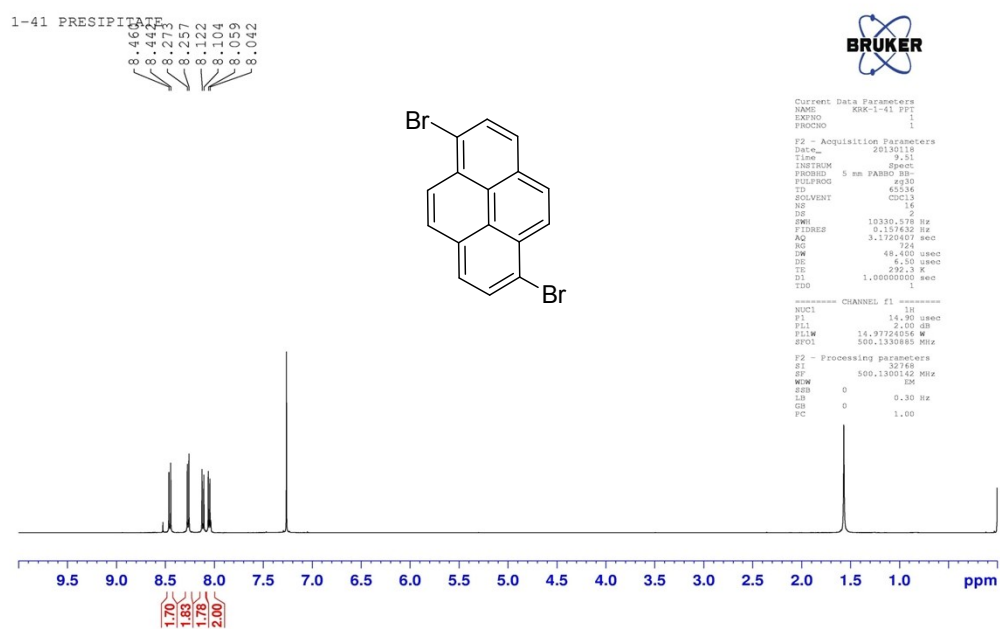


Fig. S7 ^1H NMR spectrum of **1c** recorded in CDCl_3 .

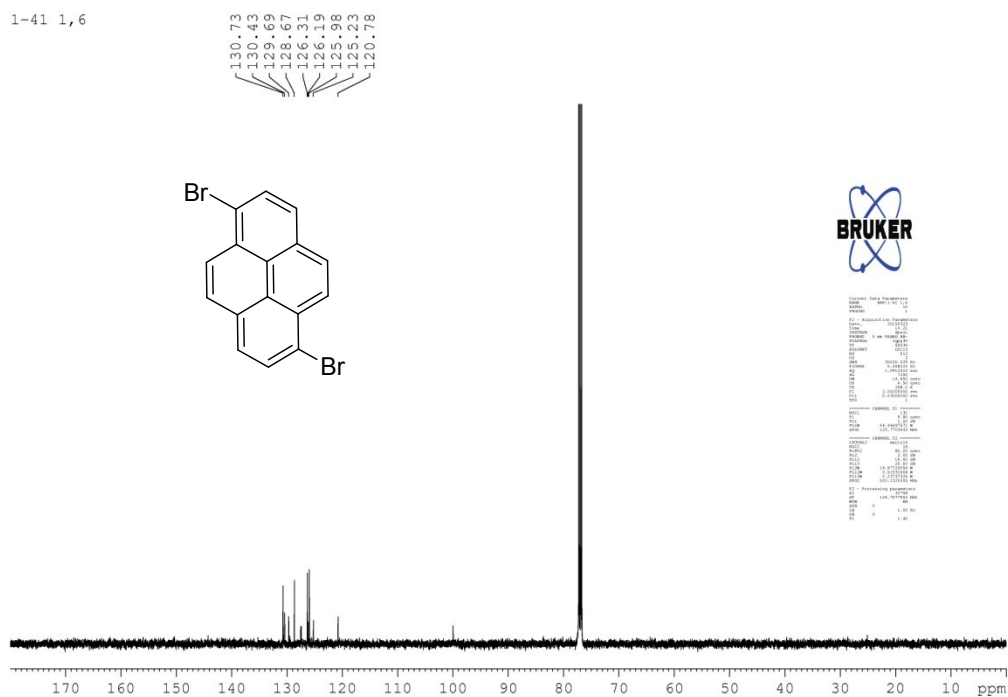


Fig. S8 ^{13}C NMR spectra of **1b** recorded in CDCl_3 .

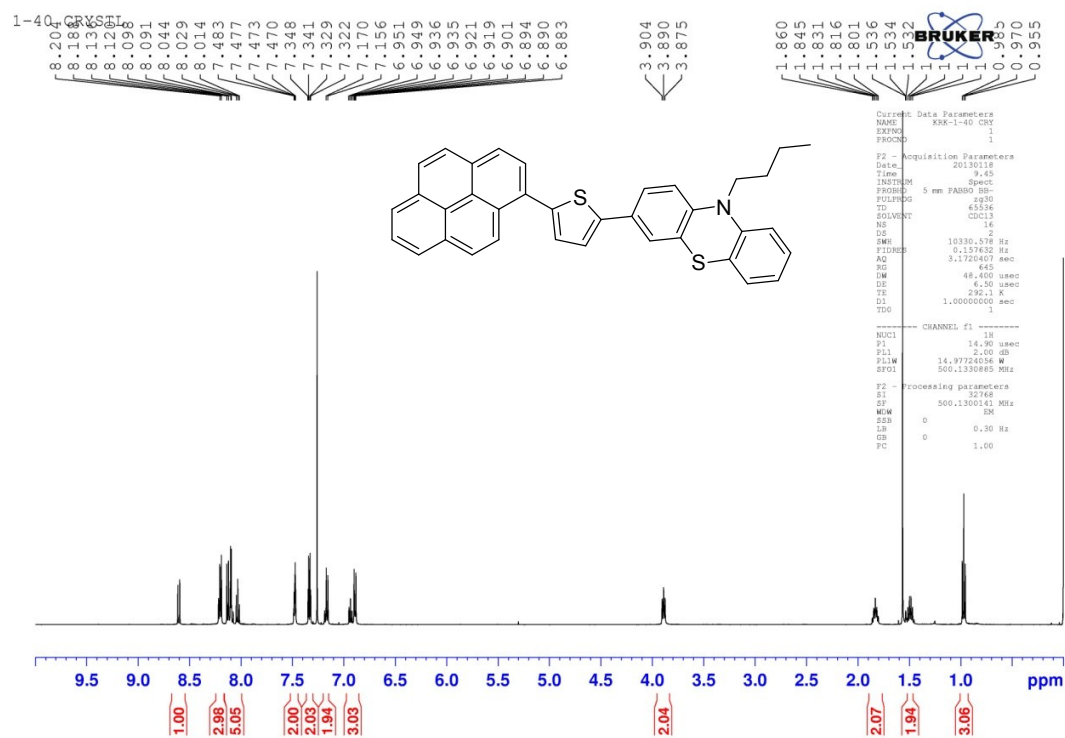


Fig. S11 ¹H NMR spectrum of PP1 recorded in CDCl₃.

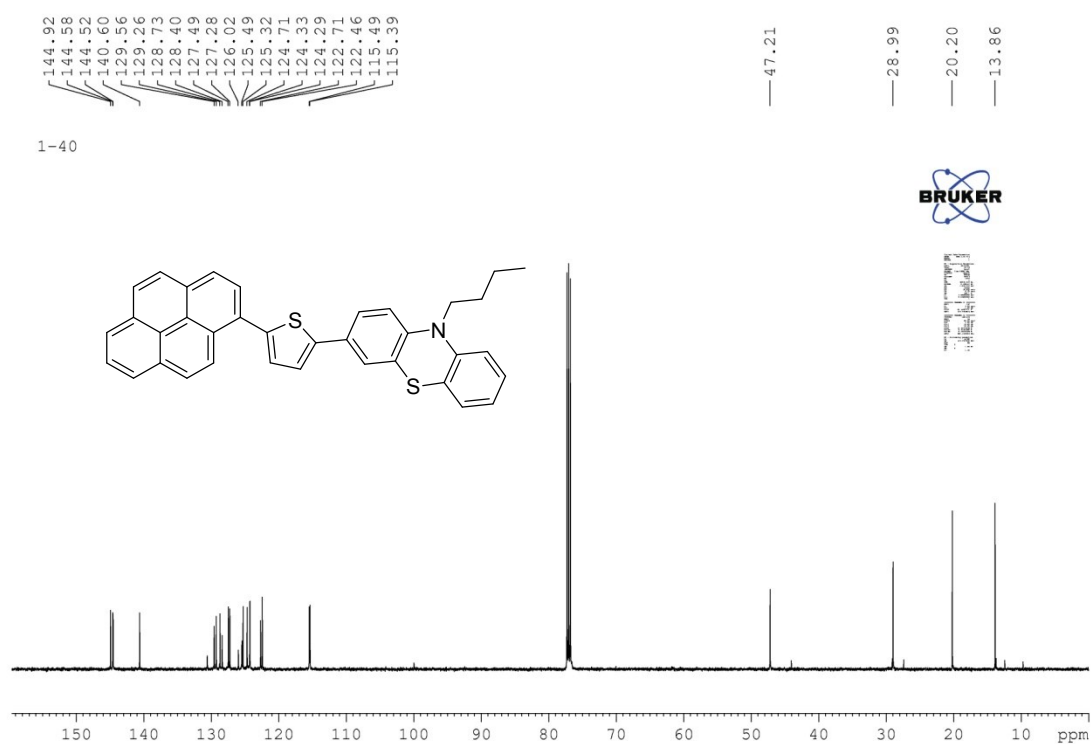


Fig. S12 ¹³C NMR spectra of PP1 recorded in CDCl₃.

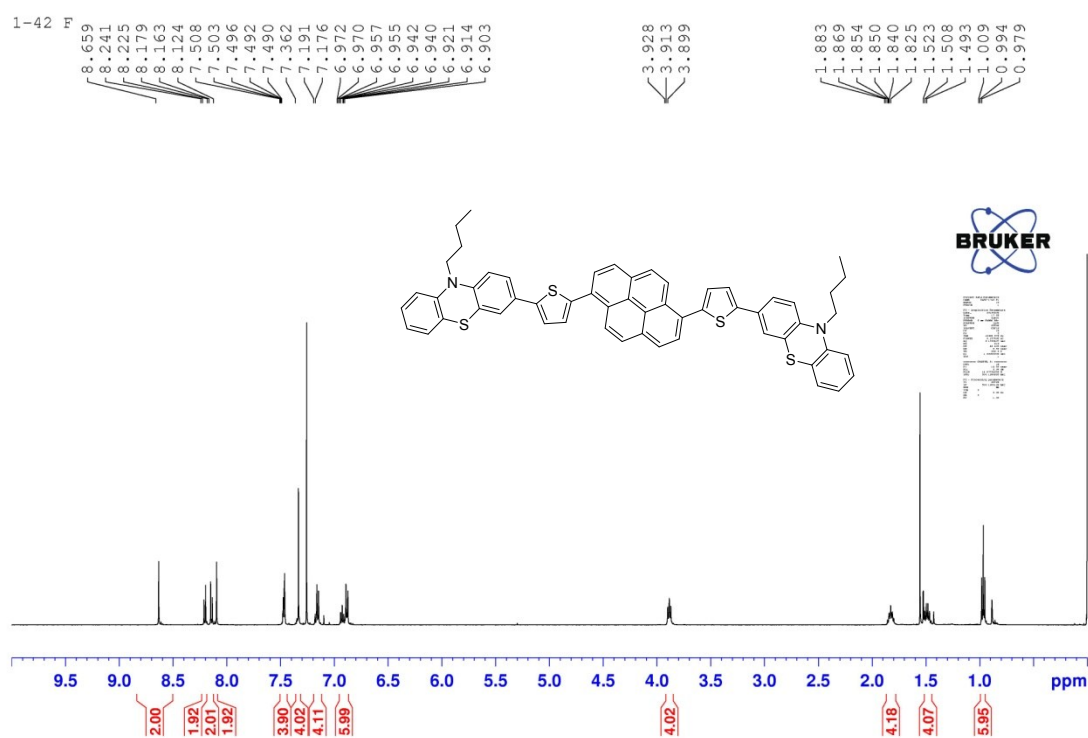


Fig. S13 ¹H NMR spectra of **PP2a** recorded in CDCl₃.

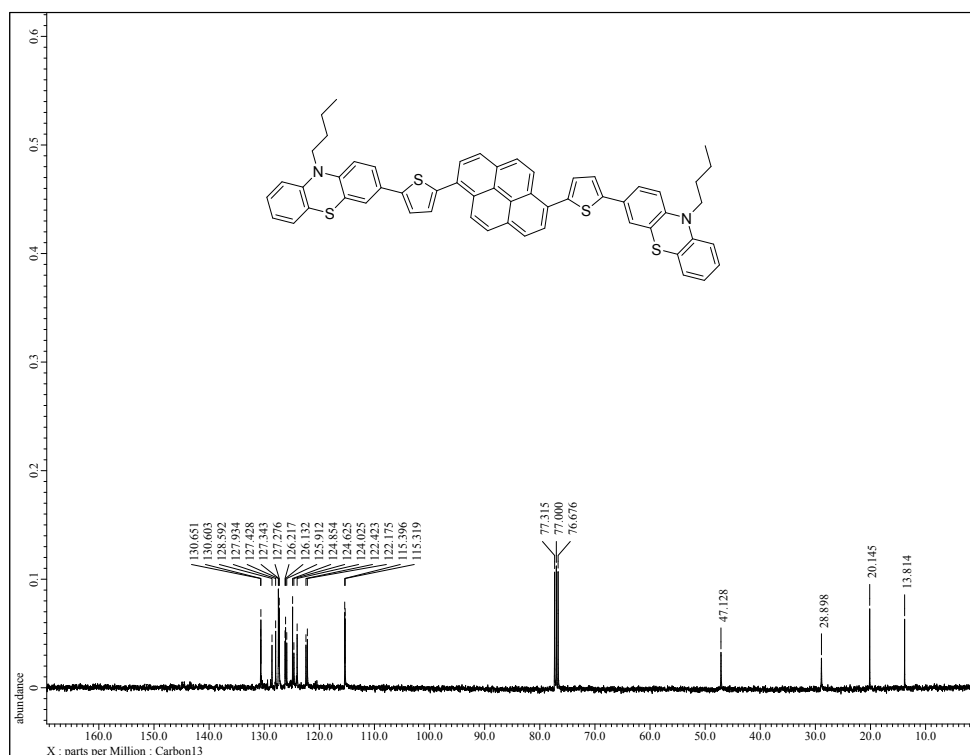


Fig. S14 ¹³C NMR spectra of **PP2a** recorded in CDCl₃.

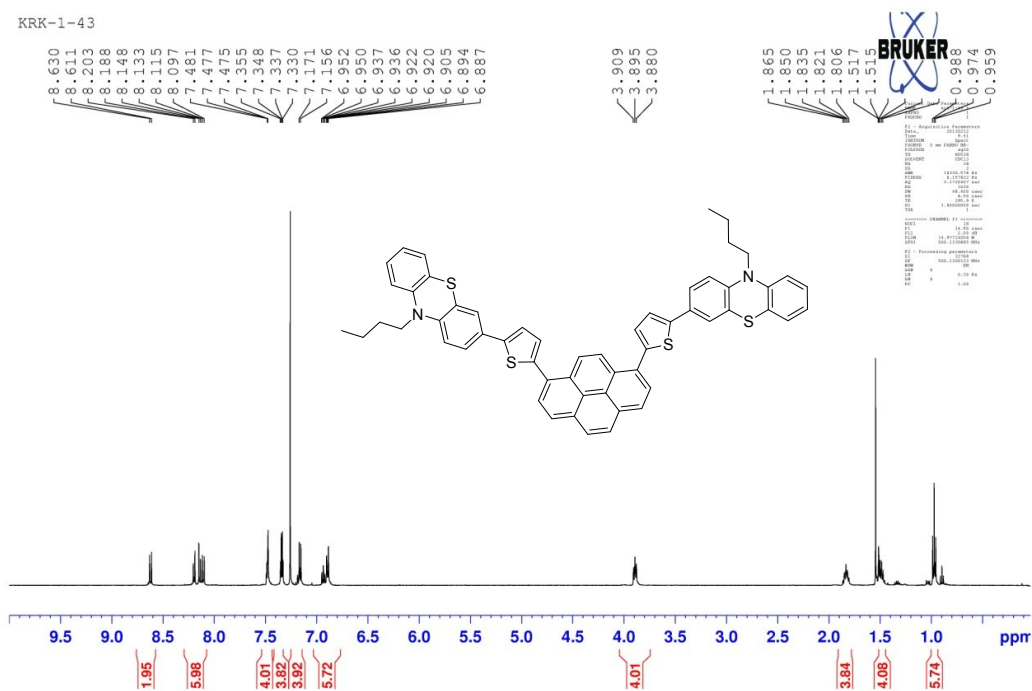


Fig. S15 ¹H NMR spectra of **PP2b** recorded in CDCl₃.

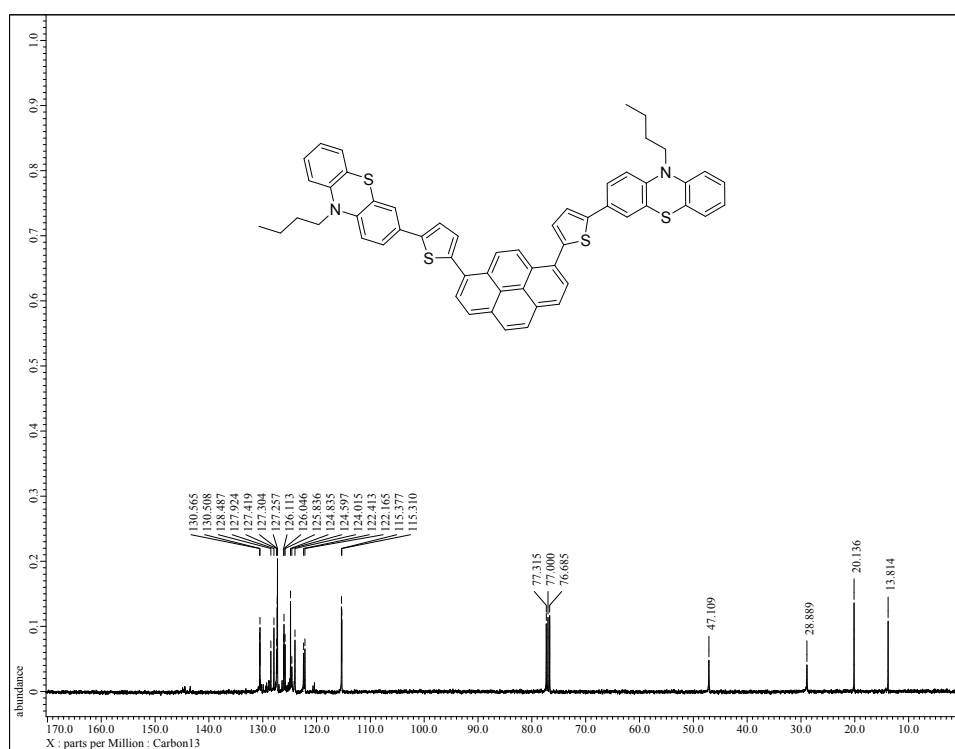
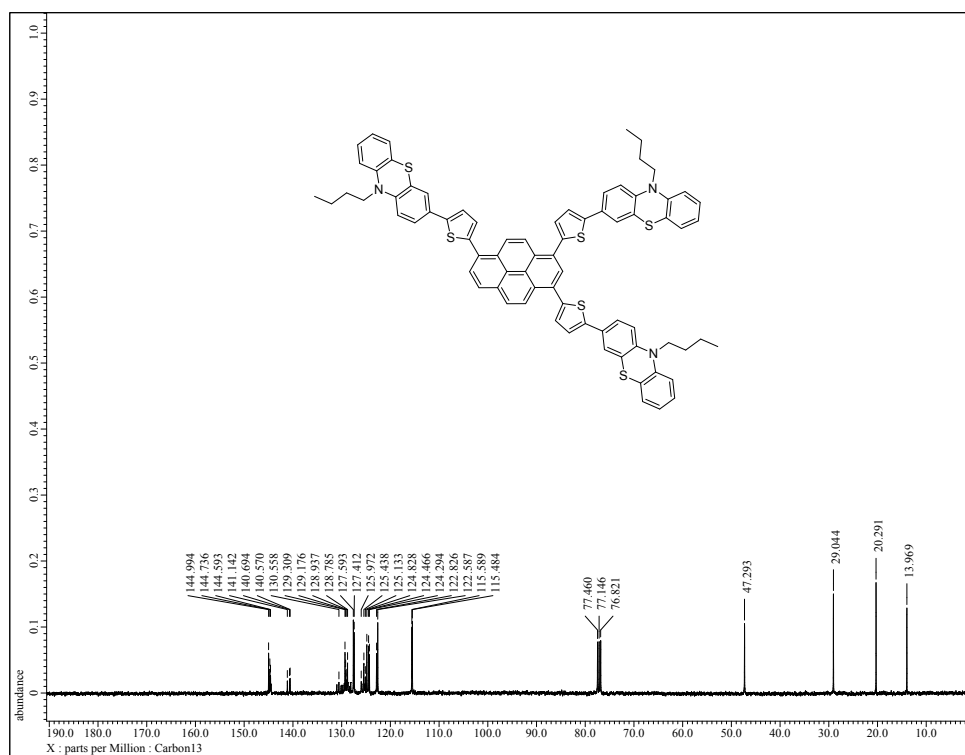
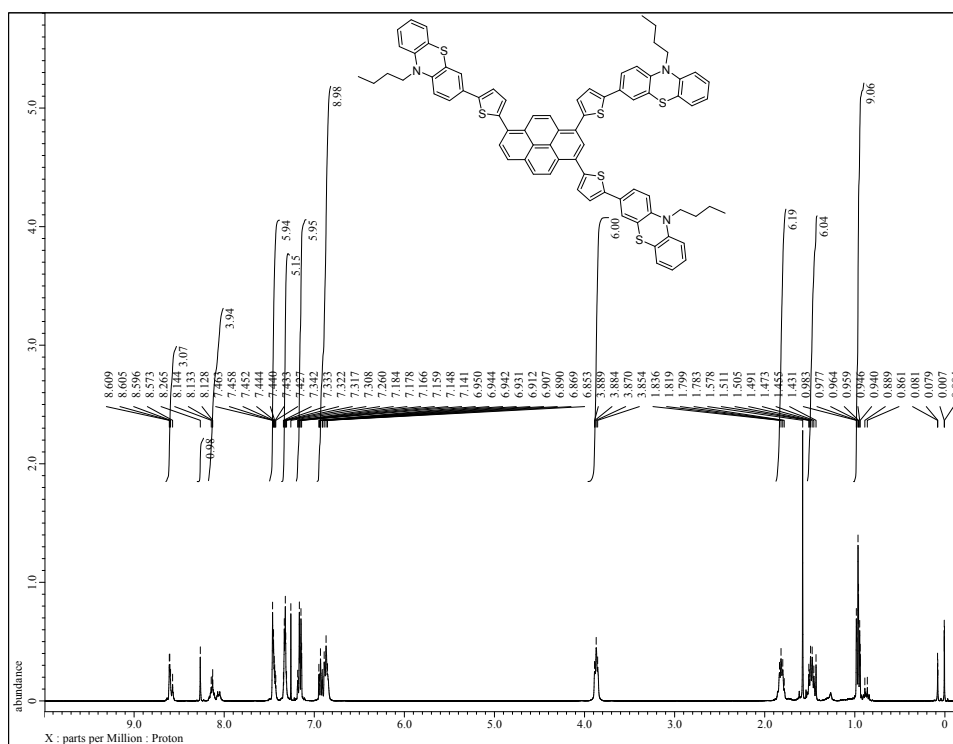


Fig. S16 ¹³C NMR spectra of **PP2b** recorded in CDCl₃.



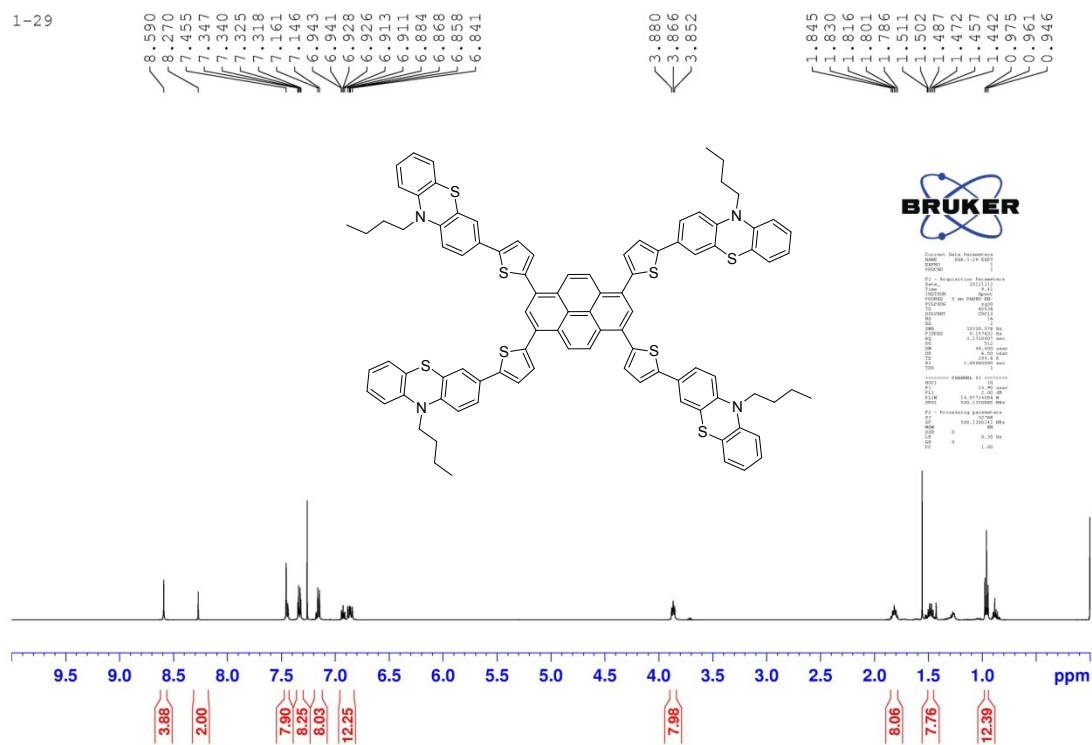


Fig. S19 ¹H NMR spectra of PP4 recorded in CDCl₃.

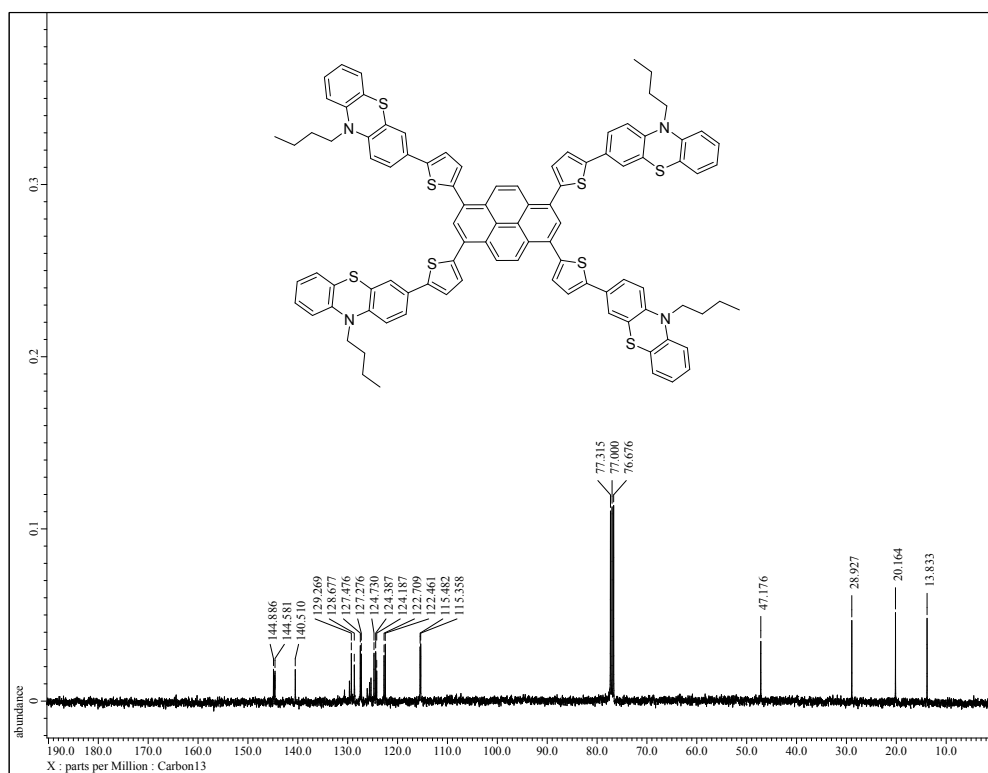


Fig. S20 ¹³C NMR spectra of PP4 recorded in CDCl₃.

Tabel S3 Cartesian coordinates for the optimized geometry of **PP1**.

Energy = -4067.8701826361 Ha

At. NO	X	Y	Z
6	5.736755000	-1.347429000	-1.387230000
6	6.245301000	-2.366113000	-2.192828000
1	5.744475000	-2.601373000	-3.126939000
6	7.392899000	-3.060967000	-1.809216000
1	7.797206000	-3.837973000	-2.450032000
6	8.004560000	-2.752478000	-0.595662000
1	8.890851000	-3.292959000	-0.277073000
6	7.477702000	-1.760167000	-0.231790000
1	7.954090000	-1.554008000	1.183105000
6	6.344142000	-1.029970000	-0.156878000
6	4.383745000	0.044182000	0.788391000
6	3.565705000	-0.145748000	-0.342859000
6	2.178680000	0.107181000	-0.241593000
1	1.584436000	-0.297931000	-1.129924000
6	1.544783000	0.165976000	0.983262000
6	2.362745000	0.355294000	2.109113000
1	1.909897000	0.575589000	3.070250000
6	3.748508000	0.268881000	2.020117000
1	4.338521000	0.384459000	2.922062000
6	6.639356000	0.673721000	1.634478000
1	7.001504000	-0.022760000	2.406175000
1	6.006805000	1.401921000	2.145766000
6	7.818056000	1.430208000	1.001678000
1	8.419843000	1.836984000	1.825828000
1	8.470136000	0.734148000	0.462356000
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1	6.763490000	3.276185000	0.616260000
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6	0.084781000	0.235763000	1.097700000
6	-0.702356000	-0.021617000	2.198432000
1	-0.293977000	-0.341821000	3.150206000
6	-2.092763000	0.144782000	1.962909000
1	-2.849411000	0.009701000	2.726937000
6	-2.399344000	0.532252000	0.677064000
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6	-3.829972000	2.043652000	-0.666333000
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6	-6.197726000	1.667191000	-1.036013000
6	-7.471228000	2.070245000	-1.561668000
1	-7.527538000	3.007131000	-2.109441000
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6	-6.099503000	0.441336000	-0.309429000
6	-7.266929000	-0.365536000	-0.137938000
7	5.789911000	-0.005064000	0.649735000
16	4.341371000	-0.378681000	-1.931630000
16	-0.923395000	0.698076000	-0.259378000
6	8.584134000	3.305050000	-0.551229000
1	8.252816000	4.107086000	-1.218378000
1	9.212583000	2.625029000	-1.137428000
1	9.217293000	3.755977000	0.221673000

Tabel S4 Cartesian coordinates for the optimized geometry of **PP2a**.

Energy = -7971.5175060928 Ha.

At. No	X	Y	Z
6	-12.335843000	1.440765000	-1.447893000
6	-12.778814000	2.471889000	-2.276070000
1	-12.241173000	2.678955000	-3.196285000
6	-13.908666000	3.215019000	-1.932498000
1	-14.262334000	4.001910000	-2.590958000
6	-14.568169000	2.941194000	-0.735809000
1	-15.441339000	3.519100000	-0.448155000
6	-14.106498000	1.935789000	0.114489000
1	-14.619842000	1.757575000	1.052219000
6	-12.991808000	1.157863000	-0.234281000
6	-11.104319000	0.018185000	0.779050000
6	-10.245694000	0.168009000	-0.327921000
6	-8.864638000	0.083249000	-0.183147000
1	-8.237215000	0.245724000	-1.054107000
6	-8.278437000	-0.198600000	1.063305000
6	-9.136923000	-0.350522000	2.164386000
1	-8.721868000	-0.576646000	3.141090000
6	-10.515525000	-0.217733000	2.031625000
1	-11.136454000	-0.304455000	2.915873000
6	-13.407580000	-0.513956000	1.562153000
1	-13.763221000	0.205664000	2.315368000
1	-12.821211000	-1.261679000	2.099668000
6	-14.597014000	-1.228890000	0.901697000
1	-15.244294000	-1.593851000	1.710749000

1	-15.197949000	0.514186000	0.328503000
6	-14.190267000	-2.398354000	-0.003048000
1	-13.614615000	-3.126694000	0.584592000
1	-13.513711000	-2.031347000	-0.782937000
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6	-6.066394000	-0.068878000	2.348222000
1	-6.495506000	0.265830000	3.285777000
6	-4.673939000	-0.270502000	2.156218000
1	-3.937915000	-0.150116000	2.942575000
6	-4.337676000	-0.669867000	0.881562000
6	-3.023702000	-1.025222000	0.321296000
6	-2.899608000	-2.224770000	-0.401798000
1	-3.778320000	-2.848618000	-0.532044000
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6	-0.518518000	-1.887058000	-0.714955000
6	0.762963000	-2.325782000	-1.178679000
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6	1.882500000	-1.571954000	-0.999964000
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6	2.854025000	1.730233000	0.548495000
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6	1.636443000	2.152026000	1.057902000
1	1.570202000	3.094646000	1.594127000
6	0.473957000	1.390004000	0.865097000
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16	5.746300000	0.343165000	0.225502000
6	6.016757000	-0.396263000	-2.221326000
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6	8.923316000	0.570485000	-0.000211000

6	9.007785000	-1.020120000	-1.798055000
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6	14.390423000	1.093036000	-0.921833000
1	13.647073000	-1.401321000	-2.003328000
1	12.479423000	-2.385968000	-1.134923000
6	14.289442000	-2.078195000	-0.034115000
1	12.836133000	3.687364000	1.495884000
6	14.514178000	3.227248000	0.216318000
6	15.060137000	2.288025000	-0.656361000
1	14.821833000	0.388417000	-1.623070000
1	14.826651000	-2.895209000	-0.534900000
1	15.029439000	-1.290035000	0.143538000
6	13.732912000	-2.571965000	1.306786000
1	15.030701000	4.160163000	0.418123000
1	16.007727000	2.485274000	-1.148594000
1	13.007395000	-3.376358000	1.122662000
1	13.174123000	-1.760563000	1.786489000
6	14.827194000	-3.076763000	2.251620000
1	14.404228000	-3.425219000	3.199093000
1	15.548212000	-2.284297000	2.482033000
1	15.383804000	-3.911071000	1.809136000

Table S5 Cartesian coordinates for the optimized geometry of **PP2b**.

Energy = -8131.2232710644 Ha

At. No	X	Y	Z
6	-9.750859000	-3.272127000	1.503232000
6	-9.732776000	-4.314695000	2.429609000
1	-9.276660000	-4.150948000	3.401164000
6	-10.309939000	-5.545780000	2.115916000
1	-10.312631000	-6.346726000	2.848255000
6	-10.872115000	-5.735223000	0.854957000
1	-11.314207000	-6.691443000	0.591655000
6	-10.858535000	-4.707855000	-0.089143000
1	-11.278304000	-4.885026000	-1.072505000
6	-10.311457000	-3.454080000	0.223877000
6	-9.112399000	-1.611682000	-0.806371000
6	-8.434943000	-1.215643000	0.363729000
6	-7.276854000	-0.447408000	0.298294000
1	-6.764658000	-0.192473000	1.220932000
6	-6.764367000	-0.006419000	-0.934349000
6	-7.435582000	-0.410743000	-2.099522000
1	-7.071021000	-0.084947000	-3.068242000
6	-8.567982000	-1.217236000	-2.038890000
1	-9.035361000	-1.533914000	-2.964297000
6	-11.272577000	-2.357393000	-1.794894000
1	-11.148583000	-3.216597000	-2.471515000
1	-11.061510000	-1.463831000	-2.385478000
6	-12.725497000	-2.270070000	-1.302182000
1	-13.372390000	-2.336346000	-2.187609000
1	-12.967004000	-3.139943000	-0.681232000
6	-13.038160000	-0.984035000	-0.527665000
1	-12.823084000	-0.116301000	-1.166466000
1	-12.361196000	-0.906919000	0.330681000
6	-5.567219000	0.836847000	-1.013115000
6	-4.626031000	0.901706000	-2.016573000
1	-4.666230000	0.274010000	-2.899604000
6	-3.591005000	1.843243000	-1.773423000
1	-2.785040000	2.040860000	-2.470461000
6	-3.719886000	2.519786000	-0.580141000
6	-2.895919000	3.601760000	-0.019589000
6	-3.533576000	4.745824000	0.490913000
1	-4.617642000	4.795105000	0.465039000
6	-2.814153000	5.822477000	0.985840000
1	-3.338464000	6.696708000	1.361765000
6	-1.410941000	5.813571000	0.986199000
6	-0.650324000	6.928724000	1.469416000
1	-1.187510000	7.798646000	1.837390000
6	0.710056000	6.902172000	1.471988000
1	1.279243000	7.750650000	1.841963000
6	1.428803000	5.757717000	0.993362000

6	2.831268000	5.711677000	1.000149000
1	3.387657000	6.566234000	1.375208000
6	3.510246000	4.605004000	0.515440000
1	4.595527000	4.611369000	0.497362000
6	2.831866000	3.482755000	0.007528000
6	1.407857000	3.476229000	0.024442000
6	0.625129000	2.337319000	-0.361579000
1	1.138594000	1.419807000	-0.621693000
6	-0.736962000	2.366489000	-0.370553000
1	-1.287130000	1.472941000	-0.639941000
6	-1.474352000	3.536733000	0.010203000
6	-0.728001000	4.658351000	0.493806000
6	0.704109000	4.629172000	0.498873000
7	-10.293014000	-2.382747000	-0.703229000
16	-9.123414000	-1.662050000	1.946843000
16	-5.161824000	1.972085000	0.258771000
6	-14.491097000	-0.919618000	-0.048317000
1	-14.688224000	0.008131000	0.498034000
1	-14.724022000	-1.754725000	0.621931000
1	-15.192799000	-0.965610000	-0.889253000
6	3.617279000	2.360242000	-0.524935000
6	3.459169000	1.640948000	-1.689990000
16	5.039653000	1.790289000	0.333216000
6	4.462335000	0.659151000	-1.901792000
1	2.667073000	1.848700000	-2.399675000
6	5.409919000	0.605069000	-0.903079000
1	4.508053000	0.036099000	-2.787746000
6	6.568971000	-0.284112000	-0.788421000
6	7.728256000	0.099925000	-0.091384000
6	6.562607000	-1.554488000	-1.387256000
6	8.810397000	-0.764202000	0.039997000
1	7.791060000	1.088388000	0.353182000
1	5.682986000	-1.887763000	-1.928196000
6	7.662597000	-2.401794000	-1.298328000
6	8.799526000	-2.039996000	-0.557989000
16	10.216103000	-0.291986000	1.030089000
1	7.628136000	-3.358474000	-1.806822000
7	9.914902000	-2.894542000	-0.401218000
6	11.484469000	-1.082479000	0.056281000
6	11.209117000	-2.331907000	-0.532733000
6	9.741580000	-4.343935000	-0.544675000
6	12.742574000	-0.494267000	-0.072869000
6	12.235260000	-2.970251000	-1.245887000
1	10.006661000	-4.686127000	-1.556759000
1	8.676355000	-4.546379000	-0.417645000
6	10.507055000	-5.155334000	0.512261000
1	12.920303000	0.478155000	0.376168000
6	13.763381000	-1.156697000	-0.755539000
6	13.503019000	-2.394881000	-1.339550000
1	12.047264000	-3.921894000	-1.729085000

1	10.361047000	-6.217088000	0.270885000
1	11.583464000	-4.968655000	0.428336000
6	10.049956000	-4.883440000	1.950413000
1	14.746820000	-0.704401000	-0.833907000
1	14.283216000	-2.916842000	-1.885400000
1	8.975176000	-5.095793000	2.034501000
1	10.168308000	-3.816394000	2.170293000
6	10.818175000	-5.713122000	2.983071000
1	10.472154000	-5.500830000	3.999560000
1	11.891650000	-5.495882000	2.946381000
1	10.692589000	-6.787800000	2.806927000

Table S6 Cartesian coordinates for the optimized geometry of **PP3**.

Energy = -11270.5245128107 Ha

At. NO	X	Y	Z
6	-0.759834000	-6.045783000	0.231445000
6	-2.089385000	-5.872633000	0.579648000
1	-2.698271000	-6.736576000	0.825107000
6	-2.692177000	-4.602255000	0.586792000
6	-1.906128000	-3.466669000	0.243759000
6	-2.405919000	-2.125152000	0.317523000
1	-3.401887000	-1.956834000	0.707593000
6	-1.651602000	-1.056894000	-0.062526000
1	-2.058739000	-0.057489000	0.029476000
6	-0.311259000	-1.207502000	-0.544939000
6	0.473693000	-0.108526000	-0.990697000
6	1.823977000	-0.324277000	-1.289692000
1	2.432479000	0.521591000	-1.591576000
6	2.431574000	-1.581858000	-1.225228000
6	1.642998000	-2.711565000	-0.877372000
6	2.163046000	-4.048257000	-0.902496000
1	3.185616000	-4.204759000	-1.222033000
6	1.395623000	-5.115807000	-0.550777000
1	1.809050000	-6.120285000	-0.580468000
6	0.034225000	-4.951613000	-0.145528000
6	-0.537080000	-3.642580000	-0.142309000
6	0.267703000	-2.516395000	-0.522290000
6	3.865170000	-1.653098000	-1.566148000
6	4.486655000	-1.075306000	-2.649650000
16	5.068891000	-2.382009000	-0.513316000
6	5.899383000	-1.216876000	-2.650742000
1	3.933115000	-0.566247000	3.430693000
6	6.390172000	-1.899120000	-1.560036000
1	6.538957000	-0.806235000	-3.423508000
6	7.782071000	-2.236056000	-1.245643000
6	8.218773000	-2.420149000	0.078815000
6	8.734648000	-2.374129000	-2.266842000
6	9.536298000	-2.761001000	0.365224000
1	7.522420000	-2.293475000	0.902083000

1	8.432594000	-2.257287000	-3.302352000
6	10.065293000	-2.666044000	-1.981372000
6	10.493099000	-2.882548000	-0.662259000
16	10.009834000	-3.132320000	2.042491000
1	10.771482000	-2.734273000	-2.800292000
7	11.827061000	-3.222415000	-0.350042000
6	11.683707000	-2.522760000	1.986892000
6	12.433102000	-2.668560000	0.802605000
6	12.689233000	-3.682133000	-1.427413000
6	12.262497000	-1.975790000	3.131239000
6	13.774453000	-2.257022000	0.809738000
1	13.074612000	-2.870455000	-2.063265000
1	12.131340000	-4.378676000	-2.056317000
1	11.656818000	-1.860398000	4.024950000
6	13.607111000	-1.600738000	3.134279000
6	14.357735000	-1.745994000	1.970593000
1	14.369577000	-2.329903000	-0.092811000
1	14.055594000	-1.194938000	4.035345000
1	15.401644000	-1.447810000	1.951602000
6	-4.115372000	-4.538330000	0.959722000
6	-4.725750000	-5.209165000	1.996755000
16	-5.331547000	-3.704964000	0.002189000
6	-6.134216000	-5.043281000	2.046544000
1	-4.162704000	-5.783006000	2.724266000
6	-6.635361000	-4.249424000	1.038826000
1	-6.757915000	-5.464012000	2.826995000
6	-8.027603000	-3.865280000	0.787753000
6	-8.360699000	-2.645887000	0.170695000
6	-9.082726000	-4.707740000	1.170448000
6	-9.684202000	-2.300964000	-0.081215000
1	-7.576473000	-1.951615000	-0.114820000
1	-8.864150000	-5.664940000	1.632282000
6	-10.410396000	-4.344981000	0.962957000
6	-10.741158000	-3.142892000	0.318312000
16	-10.053571000	-0.814303000	-0.992051000
1	-11.192858000	-5.014293000	1.300356000
7	-12.077935000	-2.771207000	0.058135000
6	-11.591044000	-0.390579000	-0.195727000
6	-12.463844000	-1.418654000	0.212393000
6	-13.106661000	-3.795371000	0.150109000
6	-11.951730000	0.948077000	-0.049056000
6	-13.703872000	-1.058716000	0.761277000
1	-13.405709000	-4.032016000	1.182695000
1	-12.741101000	-4.709468000	-0.321803000
1	-11.252701000	1.719523000	-0.357499000
6	-13.201934000	1.291763000	0.468093000
6	-14.073785000	0.283074000	0.869593000
1	-14.386029000	-1.82448600	1.111011000
1	-13.483425000	2.335831000	0.559704000
1	-15.045216000	0.532477000	1.285674000

6	-0.080989000	1.244161000	-1.148796000
6	-1.264106000	1.644341000	-1.731656000
16	0.837163000	2.653483000	-0.644647000
6	-1.437717000	3.052363000	-1.774173000
1	-1.978006000	0.941614000	-2.144806000
6	-0.390833000	3.760571000	-1.225756000
1	-2.320629000	3.530560000	-2.182605000
6	-0.231516000	5.213225000	-1.111527000
6	0.558996000	5.794463000	-0.103481000
6	-0.872117000	6.078744000	-2.011669000
6	0.731663000	7.171963000	-0.023423000
1	1.048958000	5.164437000	0.632553000
1	-1.476740000	5.668586000	-2.813803000
6	-0.741489000	7.460410000	-1.905228000
6	0.076815000	8.037832000	-0.921834000
16	1.865135000	7.852303000	1.171015000
1	-1.275872000	8.090512000	-2.606357000
7	0.265360000	9.433142000	-0.823848000
6	1.016959000	9.384840000	1.500882000
6	0.336704000	10.037466000	0.453620000
6	-0.119701000	10.260639000	-1.956196000
6	1.094272000	9.962622000	2.767278000
6	-0.250846000	11.283959000	0.717923000
1	-1.202659000	10.446612000	-2.021285000
1	0.203365000	9.773449000	-2.878228000
1	1.611016000	9.429436000	3.559470000
6	0.533210000	11.218006000	3.007871000
6	-0.136037000	11.873900000	1.978018000
1	-0.805167000	11.798986000	-0.057684000
1	0.615641000	11.670378000	3.990869000
1	-0.588872000	12.845544000	2.150898000
1	-13.990114000	-3.460910000	-0.397069000
1	0.391917000	11.222258000	-1.883399000
1	13.538285000	-4.217719000	-0.998550000
1	-0.325744000	-7.041795000	0.224151000

Table S7 Cartesian coordinates for the optimized geometry of **PP4**.

Energy = -11270.5245128107 Ha

At. NO	X	Y	Z
6	11.860622000	3.176331000	2.635678000
6	12.429035000	2.646429000	3.793188000
1	11.798903000	2.479712000	4.661535000
6	13.792951000	2.353203000	3.841807000
1	14.231729000	1.960325000	4.753309000
6	14.575733000	2.562468000	2.709450000
1	15.635758000	2.327735000	2.725550000
6	14.005664000	3.056725000	1.534842000
1	14.627966000	3.179508000	0.656371000
6	12.643042000	3.387029000	1.482910000

6	10.749150000	3.508415000	0.051319000
6	9.764157000	3.311592000	0.936944000
6	8.480656000	2.899592000	0.595232000
1	7.763294000	2.718895000	1.389879000
6	8.103781000	2.715269000	0.747533000
6	9.084372000	2.926630000	1.729277000
1	8.829489000	2.812038000	2.777597000
6	10.383869000	3.290339000	1.388837000
1	11.114565000	3.414409000	2.179194000
6	12.919214000	4.452718000	0.720288000
1	13.378616000	3.677326000	1.352249000
1	12.342946000	5.123631000	1.360376000
6	6.744511000	2.312773000	1.120199000
6	6.324710000	1.659347000	2.258214000
1	7.007121000	1.335302000	3.035559000
6	4.924825000	1.428989000	2.306648000
1	4.426186000	0.954959000	3.143870000
6	4.242836000	1.897816000	1.205316000
6	2.798217000	1.905589000	0.921200000
6	2.210151000	3.099102000	0.490114000
1	2.834045000	3.980760000	0.392381000
6	0.838832000	3.232499000	0.251302000
6	-0.006993000	2.107385000	0.445945000
6	-1.409902000	2.146584000	0.166382000
1	-1.833092000	3.046641000	0.261564000
6	-2.216833000	1.075958000	0.402141000
1	-3.270839000	1.137417000	0.161478000
6	-1.701807000	0.155180000	0.918416000
6	-2.537616000	1.269779000	1.206670000
6	-1.941002000	2.492189000	1.534907000
1	-2.577852000	3.352254000	1.712740000
6	-0.558348000	2.661705000	1.646548000
6	0.289971000	1.534757000	1.465584000
6	1.706142000	1.601931000	1.656292000
1	2.151514000	2.543585000	1.950925000
6	2.506140000	0.514365000	1.479750000
1	3.575857000	0.613457000	1.612111000
6	1.974911000	0.759221000	1.102740000
6	0.562846000	0.867292000	0.883245000
6	-0.284592000	0.276899000	1.091259000
7	12.047486000	3.922594000	0.316311000
16	10.151386000	3.681526000	2.636405000
16	5.368953000	2.648653000	0.087261000
6	-0.074486000	4.013515000	1.984450000
6	-0.574112000	4.849584000	2.957233000
16	1.149977000	4.860122000	1.050521000
6	0.012973000	6.142036000	2.968419000
1	-1.343534000	4.533487000	3.652694000
6	0.970603000	6.326080000	1.995928000
1	-0.278670000	6.922120000	3.662227000

6	1.782875000	7.516172000	1.726070000
6	2.332379000	7.764438000	0.455078000
6	2.033263000	8.459673000	2.734506000
6	3.124493000	8.881676000	0.214386000
1	2.141146000	7.076529000	0.362823000
1	1.641842000	8.296158000	3.733086000
6	2.782605000	9.605628000	2.484499000
6	3.359650000	9.834492000	1.225647000
16	3.928275000	9.071890000	1.364272000
1	2.924625000	10.320811000	3.285972000
7	4.161432000	10.965132000	0.959512000
6	3.894597000	10.850921000	1.467009000
6	4.054251000	11.614161000	0.293336000
6	4.672685000	11.726903000	2.088110000
6	3.785167000	11.472973000	2.709911000
6	4.106553000	13.011253000	0.411103000
1	3.929645000	12.401090000	-2.540906000
1	5.022753000	11.033447000	-2.855270000
1	3.647099000	10.860588000	3.595812000
6	3.872460000	12.862079000	2.816396000
6	4.034808000	13.625001000	1.662997000
1	4.199312000	13.628008000	-0.474919000
1	3.807182000	13.337216000	3.789894000
1	4.091565000	14.707513000	1.725986000
6	0.361548000	-4.558525000	0.181042000
6	0.910274000	-5.349036000	1.165450000
16	-0.920676000	-5.438618000	-0.637245000
6	0.302725000	-6.625806000	1.288827000
1	1.715703000	-5.002006000	1.802908000
6	-0.716219000	-6.845699000	0.388542000
1	0.584054000	-7.348814000	2.045747000
6	-1.554099000	-8.038304000	0.232741000
6	-2.851325000	-7.969190000	-0.307073000
6	-1.085211000	-9.299946000	0.630865000
6	-3.628127000	-9.110855000	-0.471698000
1	-3.265011000	-7.010172000	-0.603243000
1	-0.082716000	-9.397505000	1.034025000
6	-1.878347000	-10.437558000	0.514356000
6	-3.160084000	-10.372511000	-0.053927000
16	-5.203247000	-8.998735000	-1.297528000
1	-1.485212000	-11.385270000	0.862519000
7	-3.967907000	-11.517896000	-0.222187000
6	-6.064387000	-10.275668000	-0.400345000
6	-5.360402000	-11.424796000	0.011404000
6	-3.337970000	-12.824668000	-0.115573000
6	-7.436032000	-10.164433000	-0.177011000
6	-6.076869000	-12.452077000	0.643785000
1	-3.151369000	-13.143231000	0.921406000
1	-2.384792000	-12.804014000	-0.647525000
1	-7.949943000	-9.260927000	-0.490861000

6	-8.142465000	-11.208153000	0.423160000
6	-7.456740000	-12.349798000	0.829642000
1	-5.559977000	-13.335730000	0.998748000
1	-9.213630000	-11.122339000	0.574724000
1	-7.988166000	-13.165826000	1.309955000
6	-4.004744000	1.183255000	-1.167334000
6	-4.839144000	0.212918000	-1.679097000
16	-4.962505000	2.479538000	-0.469620000
6	-6.219914000	0.495459000	-1.514742000
1	-4.465950000	-0.669336000	-2.185554000
6	-6.473594000	1.689674000	-0.875642000
1	-7.006086000	-0.174315000	-1.843789000
6	-7.769587000	2.292099000	-0.550580000
6	-7.919473000	3.204214000	0.509984000
6	-8.916294000	1.968364000	-1.292480000
6	-9.148292000	3.791618000	0.791166000
1	-7.065512000	3.461967000	1.128943000
1	-8.839471000	1.282450000	-2.129528000
6	-10.157649000	2.516110000	-0.983358000
6	-10.299393000	3.452611000	0.052370000
16	-9.259701000	5.055211000	2.042677000
1	-11.020357000	2.214717000	-1.565401000
7	-11.538157000	4.057199000	0.355249000
6	-10.908363000	4.708215000	2.624637000
6	-11.889291000	4.281200000	1.707638000
6	-12.606395000	3.965564000	-0.627660000
6	-11.234806000	4.930821000	3.961707000
6	-13.199170000	4.094121000	2.173985000
1	-13.120076000	2.992046000	-0.634751000
1	-12.190911000	4.144018000	-1.621383000
1	-10.455492000	5.244120000	4.649751000
6	-12.548937000	4.772779000	4.405305000
6	-13.526479000	4.355814000	3.505677000
1	-13.970004000	3.738957000	1.500388000
1	-12.798808000	4.968163000	5.443147000
1	-14.551112000	4.215604000	3.836566000
1	-3.978271000	-13.567409000	-0.595221000
1	-13.344330000	4.743722000	-0.423439000
1	5.524069000	12.324403000	-1.756464000
1	13.716301000	-5.032857000	-0.251429000