Supporting Information

Table 1. GPC, UV-Vis Data, and Yields for Polyenes Prepared Using Monomers **M2** and **M4** and the Binuclear Trifluoroacetate-Based Initiator **I2b** Using Different Ratios of Monomer-to-Initiator $[M]_0/[I]_0$.

polymer[a]	M_n**(calcd) (g/mol)**[b]	M_n **(g/mol)**[c]	M_w/M_n[c]	λ_{max} **(nm)**[d]	**yield (%)**[e]
poly-**M2**$_{10}$	2800	9900	1.62	579	61
poly-**M2**$_{30}$	7600	15300	1.73	581	86
poly-**M2**$_{50}$	12300	18800	1.86	582	95
poly-**M2**$_{70}$	17000	25500	1.88	587	85
poly-**M2**$_{90}$	21700	27900	1.94	587	76
poly-**M2**$_{100}$	24100	30900	1.90	587	73
poly-**M4**$_{10}$	2100	4800	1.29	570[f]	52
poly-**M4**$_{30}$	5400	6800	1.38	573	61
poly-**M4**$_{50}$	8700	8400	1.33	574	75
poly-**M4**$_{70}$	12000	9300	1.39	576	67
poly-**M4**$_{90}$	15300	10600	1.37	576	76

[a] Poly-$\mathbf{M}_n$: n = $[M]_0/[I]_0$. [b] Assuming 100% conversion, including end groups. [c] Determined by GPC vs PS with the RI detector in $CHCl_3$. [d] In $CHCl_3$ at room temperature. [e] Determined by gravimetry. [f] Shoulder.

Table 2. GPC, UV-Vis Data, and Yields for Polyenes Prepared Using Monomers **M2** and **M4** and the Trinuclear Trifluoroacetate-Based Initiator **I4b** Using Different Ratios of Monomer-to-Initiator $[M]_0/[I]_0$.

polymer[a]	M_n**(calcd) (g/mol)**[b]	M_n **(g/mol)**[c]	M_w/M_n[c]	λ_{max} **(nm)**[d]	**yield (%)**[e]
poly-**M2**$_{10}$	3100	9600	1.55	579	49
poly-**M2**$_{30}$	7800	14700	1.71	582	83
poly-**M2**$_{50}$	12500	20000	1.59	582	87
poly-**M2**$_{70}$	17200	21000	1.67	583	84
poly-**M2**$_{90}$	22000	26800	1.77	584	83
poly-**M2**$_{100}$	24300	28900	1.66	583	84
poly-**M4**$_{10}$	2300	6000	1.33	570[f]	45
poly-**M4**$_{30}$	5600	6900	1.54	570[f]	51
poly-**M4**$_{37}$	6800	8200	1.48	570[f]	57
poly-**M4**$_{50}$	8900	8900	1.50	570[f]	78
poly-**M4**$_{70}$	12200	11600	1.43	570[f]	43
poly-**M4**$_{90}$	15500	12000	1.43	570[f]	67

[a] Poly-**M2**$_n$, **M4**$_n$ n = $[M]_0/[I]_0$. [b] Assuming 100% conversion, including end groups. [c] Determined by GPC vs PS with the RI detector in $CHCl_3$. [d] In $CHCl_3$ at room temperature. [e] Determined by gravimetry. [f] Shoulder.