

Electronic Supplementary Information

WCl₆ as an efficient, heterogeneous and reusable catalyst for the preparation of 14-aryl -14-*H*-dibenzo[*a,j*]xanthenes with high TOF

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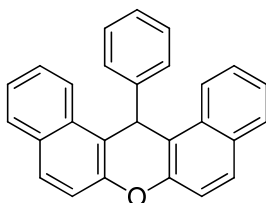
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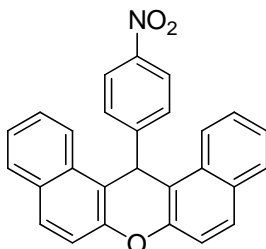
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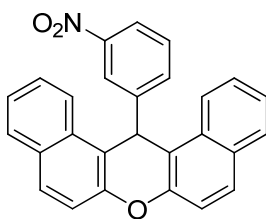
Selected spectral data of 14-aryl-14H-dibenzo[*a,j*]xanthenes



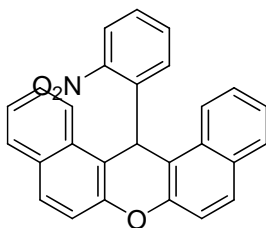
14-phenyl-14H-dibenzo[*a,j*]xanthene (1a). ^1H NMR (DMSO, 400 MHz): δ 6.74 (s, 1H), 6.97 (t, $J = 7.6$ Hz, 1H), 7.14 (t, $J = 7.6$ Hz, 2H), 7.45 (t, $J = 7.2$ Hz, 2H), 7.57 (d, $J = 8.8$ Hz, 2H), 7.62-7.66 (m, 4H), 7.91-7.93 (m, 4H), 8.70 (d, $J = 8.8$, 2H), ^{13}C NMR (CDCl_3 , 75 MHz): δ 37.0, 117.9, 118.1, 123.8, 124.9, 126.7, 127.4, 128.4, 128.8, 129.0, 129.4, 131.1, 131.3, 146.0, 148.4.



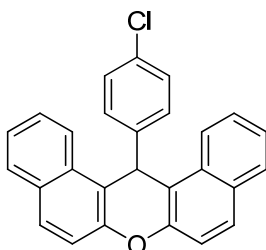
14-(4-nitrophenyl)-14H-dibenzo[*a,j*]xanthene (1b). ^1H NMR (DMSO, 300 MHz): δ 6.95 (s, 1H), 7.43 (t, $J = 7.2$ Hz, 3H), 7.58-7.65 (m, 4H), 7.81 (d, $J = 7.5$ Hz, 1H), 7.90-7.95 (m, 4H), 8.14 (d, $J = 7.8$, 1H), 8.45 (s, 1H), 8.72 (d, $J = 8.4$ Hz, 2H), ^{13}C NMR (CDCl_3 , 75 MHz): δ 36.3, 116.9, 118.2, 122.0, 122.5, 123.6, 125.2, 127.7, 129.1, 130.0, 130.4, 131.11, 131.14, 134.7, 147.9, 148.3, 148.6.



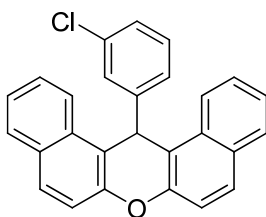
14-(3-nitrophenyl)-14H-dibenzo[a,j]xanthene (1c). ^1H NMR (DMSO, 300 MHz): δ 6.91 (s, 1H), 7.11-7.25 (m, 1H), 7.43-7.48 (m, 2H), 7.55-7.71 (m, 4H), 7.88-8.03 (m, 7H), 8.66 (d, $J = 8.4$ Hz, 2H), ^{13}C NMR (CDCl_3 , 75 MHz): δ 36.7, 116.6, 118.2, 123.6, 124.2, 125.2, 127.6, 129.1, 129.5, 130.0, 131.10, 131.19, 146.3, 148.4, 153.1.



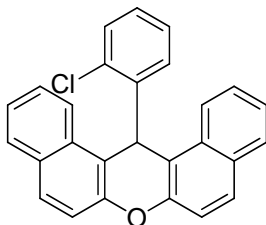
14-(2-nitrophenyl)-14H-dibenzo[a,j]xanthene (1d). ^1H NMR (DMSO, 300 MHz): δ 6.94 (s, 1H), 7.41-7.46 (m, 3H), 7.56-7.65 (m, 4H), 7.79 (d, $J = 2.1$, 1H), 7.89-7.94 (m, 4H), 8.13 (d, $J = 7.8$, 1H), 8.45 (s, 1H), 8.70 (d, $J = 6$, 2H), ^{13}C NMR (CDCl_3 , 75 MHz): δ 36.4, 116.9, 118.1, 122.0, 122.5, 123.6, 125.2, 127.7, 129.1, 130.0, 130.4, 131.1, 134.7, 147.9, 148.3, 148.6.



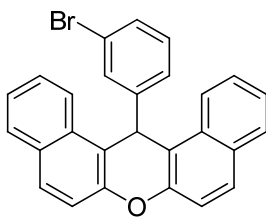
14-(4-chlorophenyl)-14H-dibenzo[*a,j*]xanthene (1e). ^1H NMR (DMSO, 300 MHz): δ 6.76 (s, 1H), 7.18 (d, $J = 6.8$ Hz, 2H), 7.46-7.64 (m, 10H), 8.92 (d, $J = 7.79$ Hz, 2H), 8.66 (d, $J = 7.6$ Hz, 2H); ^{13}C NMR (CDCl_3 , 75 MHz): δ 36.3, 117.4, 118.1, 123.4, 123.7, 125.0, 127.4, 128.8, 129.1, 129.6, 130.1, 131.1, 131.2, 144.8, 148.4.



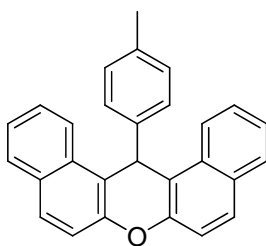
14-(3-chlorophenyl)-14H-dibenzo[*a,j*]xanthene (1f). ^1H NMR (DMSO, 300 MHz): δ 6.74 (s, 1H), 7.01 (d, $J = 8.1$, 1H), 7.13 (t, $J = 7.8$, 1H), 7.42 (t, $J = 7.2$, 2H), 7.52-7.66 (m, 6H), 7.91 (d, $J = 8.7$, 4H), 8.67 (d, $J = 8.7$, 2H), ^{13}C NMR (CDCl_3 , 75 MHz): δ 36.5, 117.2, 118.1, 123.7, 125.1, 126.8, 127.0, 127.5, 127.9, 129.1, 129.7, 130.7, 131.1, 131.2, 133.5, 148.2, 148.5.



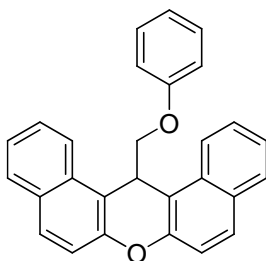
14-(2-chlorophenyl)-14H-dibenzo[*a,j*]xanthene (1g). ^1H NMR (DMSO, 300 MHz): δ 6.64 (s, 1H), 6.91-7.03 (m, 2H), 7.27 (d, $J = 7.7$ Hz, 2H), 7.38-7.50 (m, 5H), 7.57-7.70 (m, 2H), 7.76-7.90 (m, 4H), 8.54 (d, $J = 8.4$ Hz, 1H), ^{13}C NMR (CDCl_3 , 75 MHz): δ 34.8, 116.9, 118.2, 123.3, 124.9, 127.4, 128.5, 128.8, 129.2, 129.8, 130.2, 130.3, 130.9, 131.4, 132.0, 143.2, 148.7.



14-(3-bromophenyl)-14H-dibenzo[a,j]xanthene (1i). ^1H NMR (DMSO, 300 MHz): δ 6.63 (s, 1H), 6.90-7.02 (m, 2H), 7.26 (d, $J = 7.7$ Hz, 2H), 7.37-7.49 (m, 5H), 7.58 (t, $J = 7.9$ Hz, 2H), 7.85-7.89 (m, 4H), 8.53 (d, $J = 8.5$ Hz, 1H), ^{13}C NMR (CDCl_3 , 75 MHz): δ 34.8, 116.9, 118.2, 123.3, 124.9, 127.4, 128.5, 128.8, 129.1, 129.8, 130.2, 130.3, 130.9, 131.4, 132.0, 143.2, 148.6.

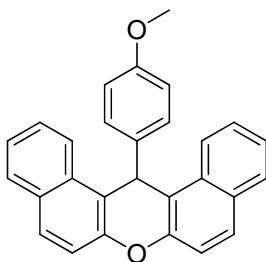


14-(4-Methylphenyl)-14H-dibenzo[a,j]xanthene (1j). ^1H NMR (DMSO, 300 MHz): δ 2.01 (s, 3H), 6.63 (s, 1H), 6.90 (d, $J = 7.2$, 2H), 7.40-7.61 (m, 8H), 7.88 (t, $J = 2.7$, 4H), 8.61 (d, $J = 8.7$, 2H), ^{13}C NMR (CDCl_3 , 75 MHz): δ 20.8, 37.4, 117.9, 118.1, 123.8, 124.9, 127.3, 128.2, 129.0, 129.3, 129.3, 131.1, 131.3, 135.8, 143.0, 148.3.

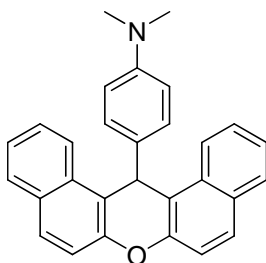


14-(phoxymethyl)-14H-dibenzo[a,j]xanthene (1k). ^1H NMR (DMSO, 300 MHz): δ 4.82 (s, 2H), 6.65 (s, 1H), 6.74 (d, $J = 7.8$ Hz, 1H), 7.27 (s, 4), 7.41-7.78 (m, 7H), 7.88

(d, $J = 6.4$, 3H) 8.66 (d, $J = 8.3$, 2H), ^{13}C NMR (CDCl_3 , 75 MHz): δ 36.2, 62.5, 114.9, 118.0, 123.8, 124.8, 127.2, 127.9, 128.1, 128.7, 129.0, 129.2, 129.3, 131.1, 131.3, 137.3, 138.3, 148.3, 157.1.



14-(4-methoxyphenyl)-14H-dibenzo[a,j]xanthene (1l). ^1H NMR (DMSO, 300 MHz): δ 3.52 (s, 3H), 6.63 (s, 1H), 6.67 (d, $J = 7.5$, 2H), 7.19-7.62 (m, 8H), 7.87-7.92 (m, 4H), 8.64 (d, $J = 8.7$, 2H), ^{13}C NMR (CDCl_3 , 75 MHz): δ 36.0, 55.3, 114.1, 118.1, 123.9, 124.9, 127.9, 124.9, 127.3, 129.2, 131.1, 135.7, 138.1, 147.0, 148.3, 149.4, 156.8.



4-(14H-dibenzo[a,j]xanthen-14-yl)-N,N-dimethylaniline (1m). ^1H NMR (DMSO, 300 MHz): δ 2.60 (s, 6H), 6.42 (d, $J = 7.2$ Hz, 2H), 6.56 (s, 1H), 7.37-7.92 (m, 12H), 8.64 (d, $J = 8$, 2H), ^{13}C NMR (CDCl_3 , 75 MHz): δ 36.0, 40.8, 112.6, 118.1, 118.4, 123.9, 124.8, 127.2, 128.8, 128.9, 129.0, 131.1, 131.4, 133.8, 148.3, 149.0. MS: $m/z = 402$ ($\text{M}^+ + 1$), 401 (M^+), 357 ($\text{M}^+ - \text{N}(\text{CH}_3)_2$), 281 ($\text{M}^+ - \text{N,N-dimethylaniline}$).

