Electronic Supplementary Information (ESI)

Classifying deep eutectic solvents for polymer solvation *via* intramolecular dimer formation

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Table S1: Excimer-to-monomer emission intensity ratios (I_E/I_M) at varying concentrations of Py-PDMS-Py dissolved in DESs ChCl:Gly and ChCl:Urea, glycerol (Gly) and PDMS2000 at 293.15 K. The relative error associated with I_E/I_M ratios is ≤ ±5%.

[Py-PDMS-Py]/μM	I_E/I_M
ChCl:Gly	
0.1	0.25
1.0	0.24
5.0	0.25
10.0	0.25
25.0	0.24
50.0	0.25
ChCl:Urea	
0.1	0.81
1.0	0.78
5.0	0.81
10.0	0.79
25.0	0.79
50.0	0.78
Gly	
0.1	0.47
1.0	0.48
5.0	0.49
10.0	0.48
25.0	0.47
50.0	0.47
PDMS2000	
0.1	0.52
1.0	0.53
5.0	0.52
10.0	0.51
25.0	0.50
50.0	0.50

Table S2: Recovered excited-state intensity decay parameters for 1-MePy (10 μM; excitation with 340 nm NanoLED) dissolved in DESs ChCl:Gly and ChCl:Urea, glycerol (Gly) and PDMS2000 at different temperatures. Errors associated with decay times are ≤ ±5%.

Temperature (K)	λ_{em} (nm)	τ /ns	χ^2
	ChCl:Gly		
293.15	377	103.7	1.18
303.15	377	100.3	1.21
313.15	377	98.8	1.26
323.15	377	96.0	1.15
333.15	377	94.0	1.13
343.15	377	92.5	1.19
353.15	377	90.2	1.08
363.15	377	87.2	1.10
	ChCl:Urea		
293.15	377	90.8	1.08
303.15	377	88.5	1.13
313.15	377	86.0	1.21
323.15	377	85.7	1.22
333.15	377	83.4	1.07
343.15	377	81.9	1.24
353.15	377	78.9	1.13
363.15	377	76.8	1.20
	Gly		
293.15	377	131.6	1.21
303.15	377	128.2	1.25

313.15	377	125.8	1.32
323.15	377	121.7	1.27
333.15	377	118.2	1.22
343.15	377	115.3	1.43
353.15	377	111.6	1.33
363.15	377	107.5	1.38
	PDMS2000		
293.15	377	26.4	1.14
303.15	377	23.0	1.13
313.15	377	20.6	1.06
323.15	377	18.3	1.26
333.15	377	16.3	1.39
343.15	377	15.0	1.13
353.15	377	13.9	1.12
363.15	377	12.6	1.19

Table S3: Recovered excited-state intensity decay parameters for Py-PDMS-Py (10 μM; excitation with 340 nm NanoLED) dissolved in DESs ChCl:Gly and ChCl:Urea, glycerol (Gly) and PDMS2000 at different temperatures obtained *via* global fitting strategy. Errors associated with decay times are ≤ ±5%.

Temperature (K)	λ_{em} (nm)	τ_1 /ns (α_1)	τ_2 /ns (α_2)	χ^2
		ChCl:Gly		
293.15	377	26.8 (0.17)	115.6 (0.83)	1.67
	480	26.8 (0.97)	115.6 (0.03)	1.57
303.15	377	25.9 (0.16)	113.3 (0.84)	1.52
	480	25.9 (0.97)	113.3 (0.03)	1.80
313.15	377	23.9 (0.16)	110.2 (0.84)	1.61
	480	23.9 (0.97)	110.2 (0.03)	1.54
323.15	377	22.3 (0.17)	107.4 (0.83)	1.69
	480	22.3 (0.98)	107.4 (0.02)	1.50
333.15	377	20.8 (0.18)	104.3 (0.82)	1.62
	480	20.8 (0.98)	104.3 (0.02)	1.62
343.15	377	19.2 (0.18)	101.6 (0.82)	1.60
	480	19.2 (0.98)	101.6 (0.02)	1.63
353.15	377	17.6 (0.18)	99.2 (0.82)	1.43
	480	17.6 (0.98)	99.2 (0.02)	1.63
363.15	377	16.4 (0.18)	95.4 (0.82)	1.49
	480	16.4 (0.99)	95.4 (0.01)	1.64

		ChCl:Urea		
293.15	377	35.4 (0.20)	100.2 (0.80)	2.22
	480	35.4 (0.98)	100.2 (0.02)	1.31
303.15	377	32.7 (0.19)	97.4 (0.81)	2.16
	480	32.7 (0.98)	97.4 (0.02)	1.34
313.15	377	30.1 (0.18)	95.7 (0.82)	2.09
	480	30.1 (0.99)	95.7 (0.01)	1.25
323.15	377	27.4 (0.17)	93.2 (0.83)	2.04
	480	27.4 (0.99)	93.2 (0.01)	1.37
333.15	377	24.3 (0.18)	90.5 (0.82)	2.43
	480	24.3 (0.99)	90.5 (0.01)	1.23
343.15	377	22.1 (0.17)	88.4 (0.83)	2.18
	480	22.1 (0.99)	88.4 (0.01)	1.29
353.15	377	19.7 (0.17)	85.4 (0.83)	2.18
	480	19.7 (0.99)	85.4 (0.01)	1.29
363.15	377	17.5 (0.20)	83.1 (0.80)	2.11
	480	17.5 (0.99)	83.1 (0.01)	1.27
		Gly		
293.15	377	51.9 (0.35)	165.0 (0.65)	2.66
	480	51.9 (1.00)	165.0 (0.00)	1.78
303.15	377	48.9 (0.34)	160.1 (0.66)	2.47
	480	48.9 (1.00)	160.1 (0.00)	1.58
313.15	377	45.6 (0.32)	154.4 (0.68)	2.38
	480	45.6 (1.00)	154.4 (0.00)	1.49
323.15	377	42.2 (0.29)	148.2 (0.71)	2.27
	480	42.2 (1.00)	148.2 (0.00)	1.36

333.15	377	38.4 (0.28)	142.7 (0.72)	2.18
	480	38.4 (1.00)	142.7 (0.00)	1.35
343.15	377	34.8 (0.26)	136.4 (0.74)	2.07
	480	34.8 (1.00)	136.4 (0.00)	1.33
353.15	377	31.1 (0.24)	130.6 (0.76)	2.13
	480	31.1 (1.00)	130.6 (0.00)	1.33
363.15	377	27.6 (0.24)	125.3 (0.76)	2.02
	480	27.6 (1.00)	125.3 (0.00)	1.19
		PDMS2000		
293.15	377	3.2 (0.12)	22.8 (0.88)	1.72
	480	3.2 (–0.46)	22.8 (0.54)	2.29
303.15	377	2.8 (0.16)	21.0 (0.84)	1.79
	480	2.8 (–0.46)	21.0 (0.54)	2.58
313.15	377	2.9 (0.17)	19. 3 (0.83)	1.63
	480	2.9 (–0.45)	19. 3 (0.55)	2.57
323.15	377	3.1 (0.19)	17.8 (0.81)	1.71
	480	3.1 (–0.44)	17.8 (0.56)	2.57
333.15	377	3.6 (0.21)	16.1 (0.79)	1.64
	480	3.6 (–0.43)	16.1 (0.57)	2.55
343.15	377	3.6 (0.20)	14.6 (0.80)	1.69
	480	3.6 (–0.43)	14.6 (0.57)	2.51
353.15	377	3.3 (0.19)	13.2 (0.81)	1.36
	480	3.3 (–0.42)	13.2 (0.58)	2.08
363.15	377	3.2 (0.21)	12.0 (0.79)	1.47
	480	3.2 (–0.41)	12.0 (0.59)	1.95

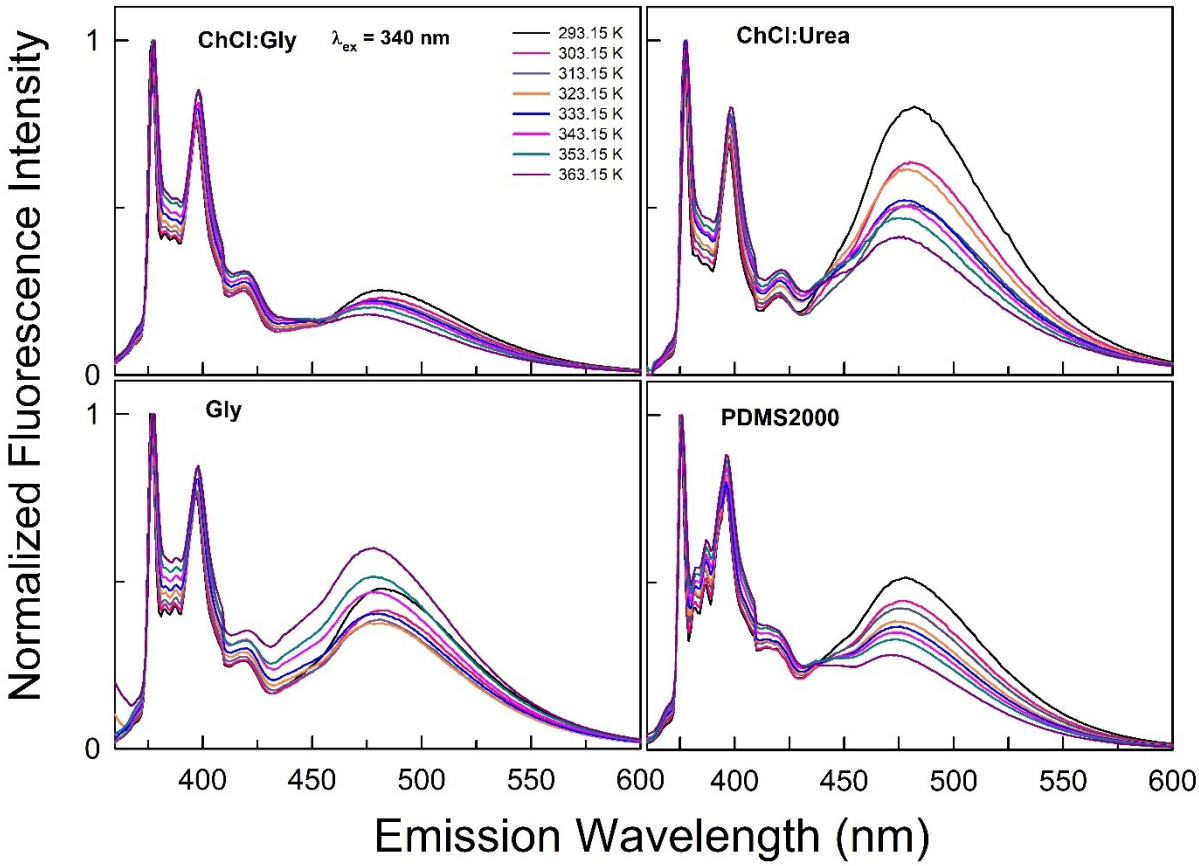

Fig. S1: Normalized steady-state fluorescence emission spectra [λ_{exc} = 340 nm (Xe arc lamp); excitation and emission slits are 1 and 1 nm, respectively] of Py-PDMS-Py (10 μM) dissolved in DESs ChCl:Gly and ChCl:Urea, glycerol (Gly) and PDMS2000 at different temperatures.

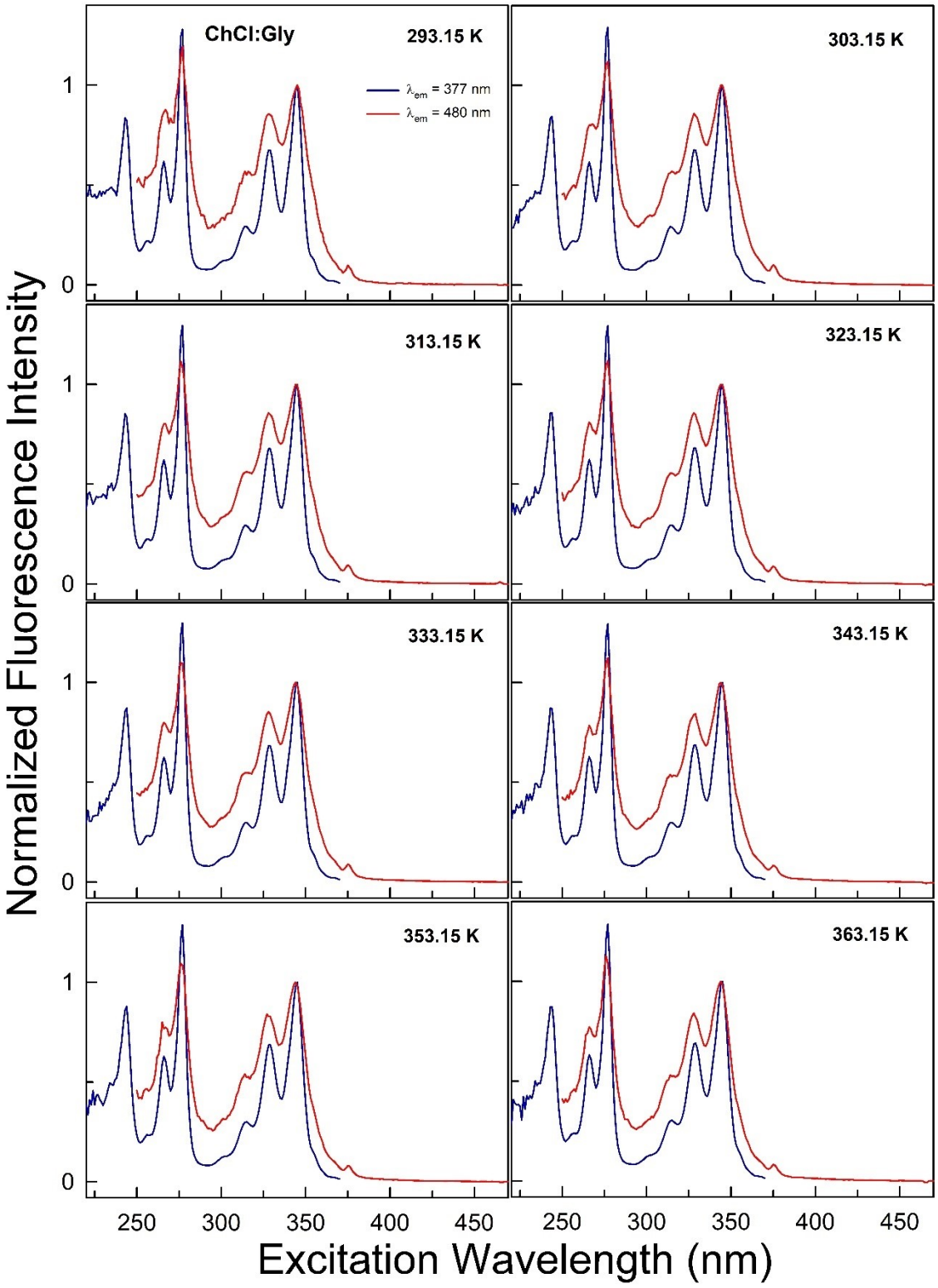

Fig. S2: Normalized emission wavelength-dependent fluorescence excitation spectra of Py-PDMS-Py (10 μM) dissolved in DES ChCl:Gly recorded while monitoring the emission at 377 nm and 480 nm [emission and excitation slits are 1 and 1 nm, respectively] at different temperatures.

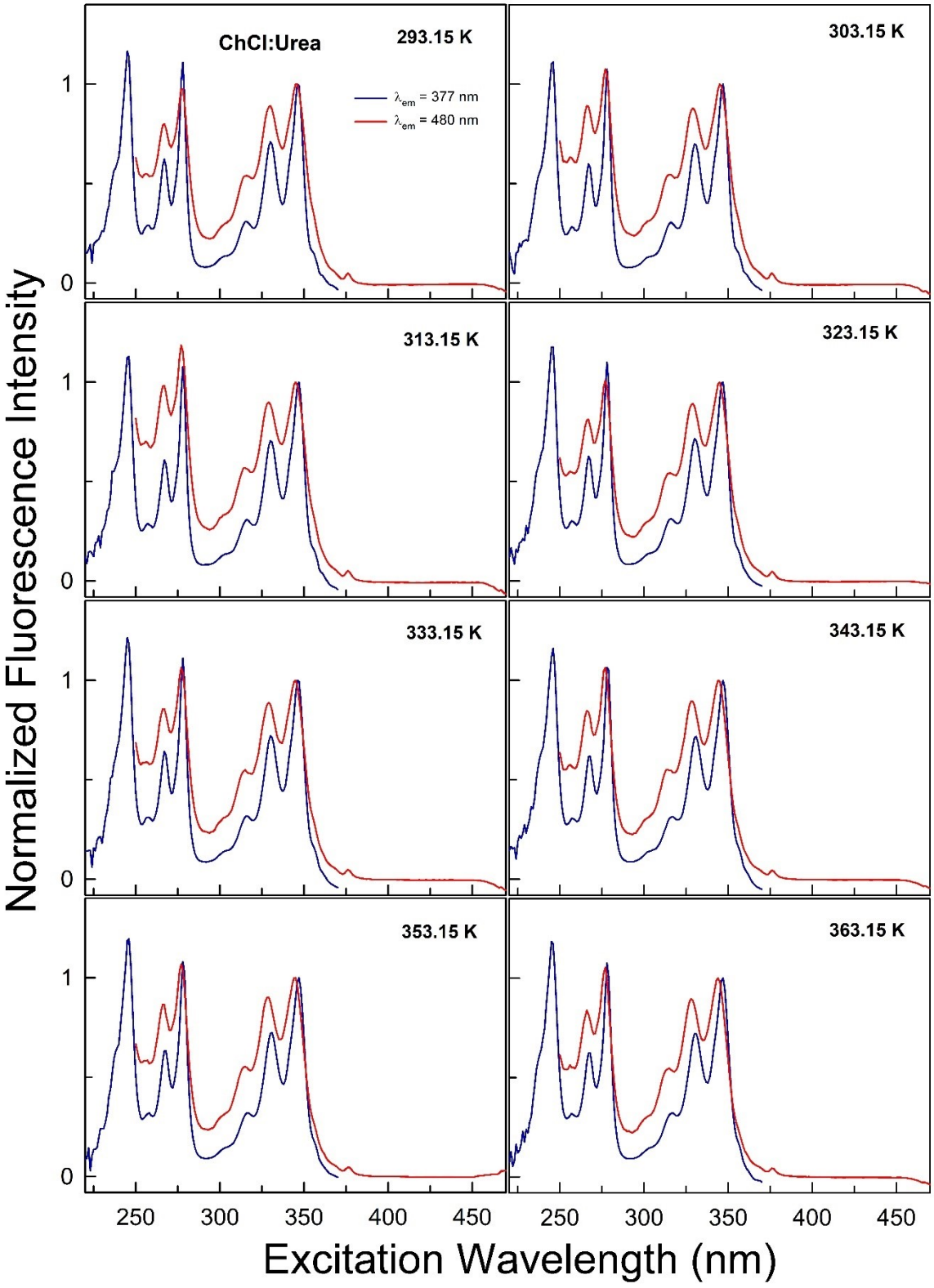

Fig. S3: Normalized emission wavelength-dependent fluorescence excitation spectra of Py-PDMS-Py (10 μM) dissolved in DES ChCl:Urea recorded while monitoring the emission at 377 nm and 480 nm [emission and excitation slits are 1 and 1 nm, respectively] at different temperatures.

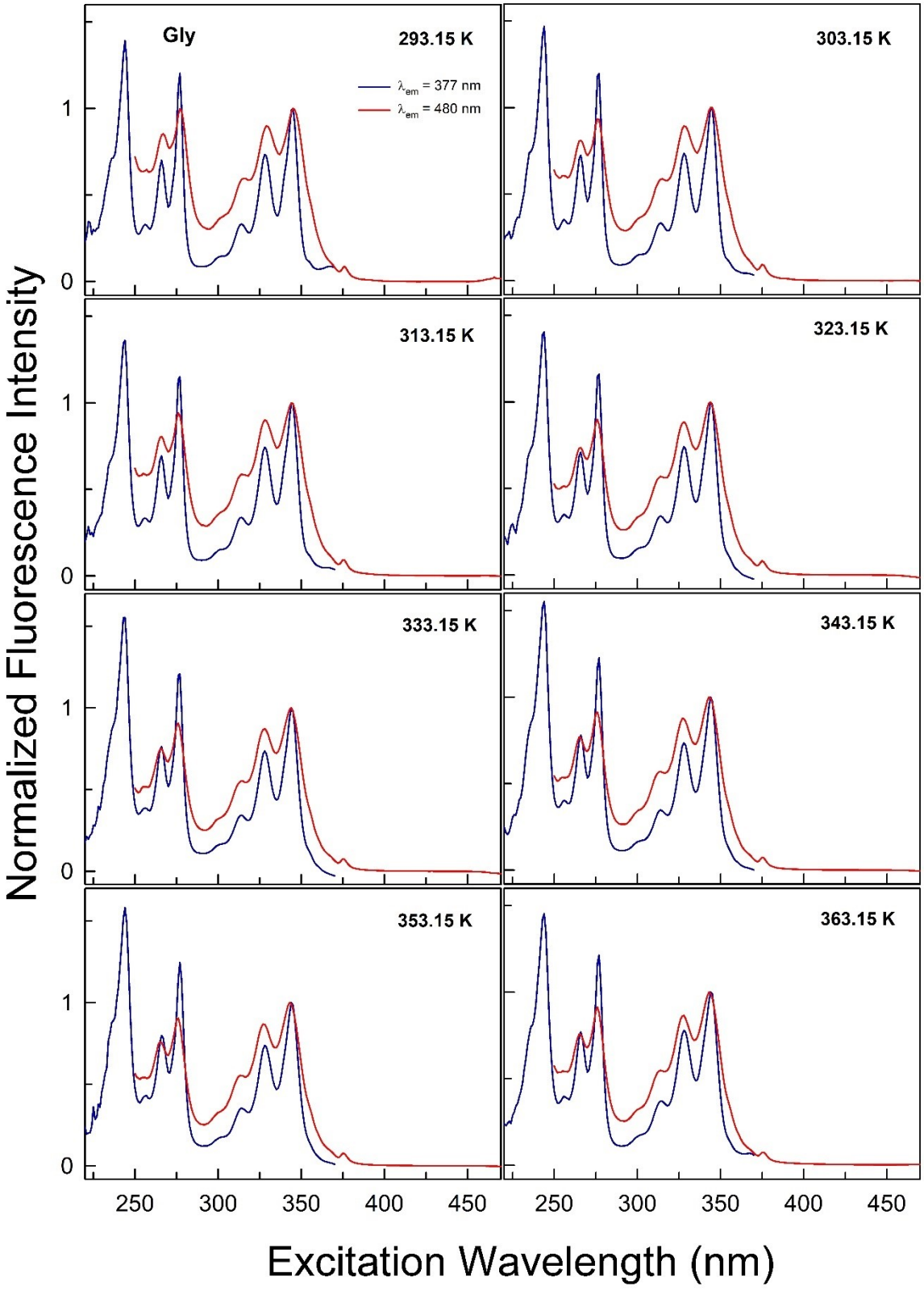

Fig. S4: Normalized emission wavelength-dependent fluorescence excitation spectra of Py-PDMS-Py (10 μM) dissolved in glycerol (Gly) recorded while monitoring the emission at 377 nm and 480 nm [emission and excitation slits are 1 and 1 nm, respectively] at different temperatures.

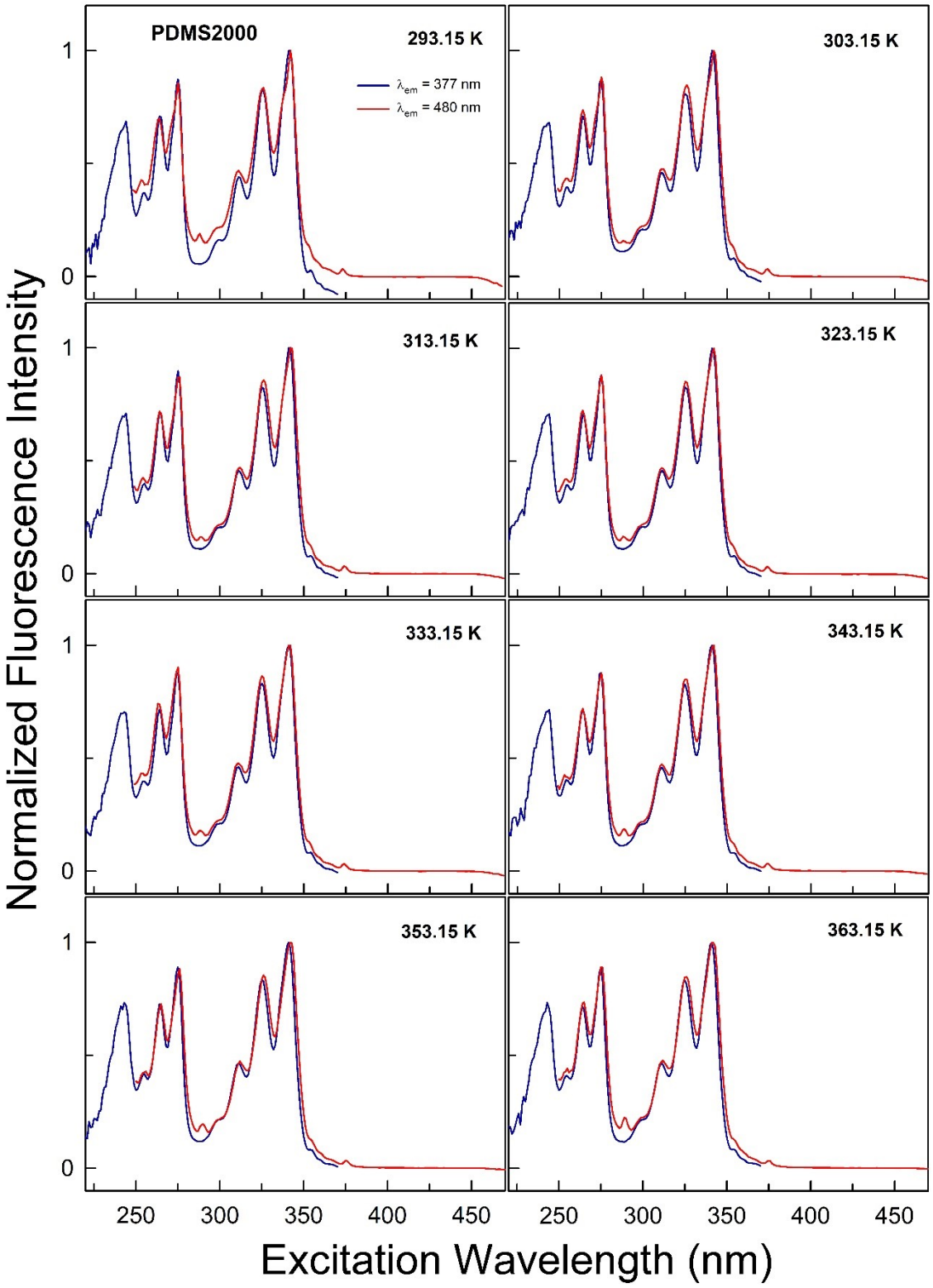

Fig. S5: Normalized emission wavelength-dependent fluorescence excitation spectra of Py-PDMS-Py (10 μM) dissolved in PDMS2000 recorded while monitoring the emission at 377 nm and 480 nm [emission and excitation slits are 1 and 1 nm, respectively] at different temperatures.