Supporting information

Table 1. Experimental sorption data and calculated Fickian diffusion coefficients for the polystyrene/toluene system. The diffusion coefficients and Deborah numbers in brackets represent values calculated with extrapolated diffusion coefficients to infinite film thickness as described by Kishimoto and Matsumoto[2]. Moreover the comparison of predicted and observed diffusion regime for the polystyrene/toluene system is given in this table. The experimental data for 30°C were taken from our previous work[1, 7] and the data for the 50°C measurements were taken from Heuwers[14].

T (d_0)	w	$T_{g,mixture}$	$\Delta T_{g,mixture}$	$D\,x10^8$	a	τ_m	$L\,x10^3$	$(Deb)_D$	Deb-diffusion regime	Experimental observation
[°C]	[g_{Tol}/ $g_{mixture}$]	[°C]	[K]	[cm²/s]	[-]	[s]	[cm]	[-]	$10 < (Deb)_D < 0$	
30 (15µm)	0.1522	27.4	2.6	0.20 (0.32)	0.449	$1.22\cdot10^4$	0.825	$3.59\cdot10^1$ ($5.74\cdot10^1$)	Fickian	non-Fickian
	0.1654	21.7	8.3	0.24 (0.84)	0.103	$2.80\cdot10^3$	0.830	$9.77\cdot10^0$ ($3.42\cdot10^1$)	Fickian	non-Fickian
	0.1801	15.6	14.4	0.25 (1.14)	0.029	$8.02\cdot10^2$	0.835	$2.88\cdot10^0$ ($1.31\cdot10^1$)	Fickian	non-Fickian
	0.1933	10.2	19.8	0.23 (1.37)	0.018	$5.00\cdot10^2$	0.841	$1.63\cdot10^0$ ($9.68\cdot10^0$)	non-Fickian	non-Fickian
30 (29µm)	0.1454	30.3	-0.3	0.28 (0.32)	1.104	$3.00\cdot10^4$	1.539	$3.55\cdot10^1$ ($4.06\cdot10^1$)	Fickian	non-Fickian
	0.1582	24.8	5.2	0.59 (0.84)	0.220	$5.98\cdot10^3$	1.548	$1.47\cdot10^1$ ($2.10\cdot10^1$)	Fickian	non-Fickian

	0.1717	19.0	11.0	0.73 (1.14)	0.057	$1.56\cdot10^{3}$	1.557	$4.69\cdot10^{0}$ ($7.32\cdot10^{0}$)	non-Fickian	non-Fickian
	0.1861	13.1	16.9	0.82 (1.37)	0.019	$5.17\cdot10^{2}$	1.567	$1.73\cdot10^{0}$ ($2.88\cdot10^{0}$)	non-Fickian	non-Fickian
	0.2015	7.0	23.0	0.90	0.007	$2.04\cdot10^{2}$	1.579	$7.36\cdot10^{-1}$	[-]	[-]
	0.2158	1.4	28.6	0.76	0.004	$9.96\cdot10^{1}$	1.591	$2.99\cdot10^{-1}$	[-]	[-]
	0.2335	-5.2	35.2	0.66	0.002	$4.89\cdot10^{1}$	1.604	$1.25\cdot10^{-1}$	[-]	[-]
50 (30μm)	0.0973	52.6	-2.6	0.04	2.469	$6.72\cdot10^{4}$	1.566	$1.10\cdot10^{1}$	Fickian	Fickian
	0.1055	48.7	1.3	0.10	0.662	$1.80\cdot10^{4}$	1.573	$7.28\cdot10^{0}$	non-Fickian	Fickian
	0.1142	44.5	5.5	0.19	0.203	$5.53\cdot10^{3}$	1.579	$4.21\cdot10^{0}$	non-Fickian	Fickian
	0.1236	40.2	9.8	0.30	0.074	$2.01\cdot10^{3}$	1.588	$2.39\cdot10^{0}$	non-Fickian	Fickian
	0.1334	35.7	14.3	0.56	0.030	$8.17\cdot10^{2}$	1.596	$1.80\cdot10^{0}$	non-Fickian	Fickian
50 (51μm)	0.0975	52.5	-2.5	0.06	2.380	$6.48\cdot10^{4}$	2.649	$5.54\cdot10^{0}$	non-Fickian	Fickian
	0.1057	48.6	1.4	0.14	0.642	$1.75\cdot10^{4}$	2.660	$3.46\cdot10^{0}$	non-Fickian	Fickian
	0.1143	44.5	5.5	0.20	0.203	$5.53\cdot10^{3}$	2.674	$1.55\cdot10^{0}$	non-Fickian	Fickian
	0.1233	40.3	9.7	0.38	0.075	$2.05\cdot10^{3}$	2.688	$1.08\cdot10^{0}$	non-Fickian	Fickian
	0.1326	36.1	13.9	0.70	0.032	$8.80\cdot10^{2}$	2.702	$8.44\cdot10^{-1}$	non-Fickian	Fickian
50 (76μm)	0.0956	53.5	-3.5	0.06	3.471	$9.45\cdot10^{4}$	3.949	$3.63\cdot10^{0}$	non-Fickian	Fickian
	0.1041	49.4	0.6	0.11	0.824	$2.24\cdot10^{4}$	3.967	$1.57\cdot10^{0}$	non-Fickian	Fickian

	0.1127	45.3	4.7	0.22	0.251	$6.82\cdot10^{3}$	3.989	$9.43\cdot10^{-1}$	non-Fickian	Fickian
	0.1231	40.4	9.6	0.45	0.077	$2.10\cdot10^{3}$	4.008	$5.87\cdot10^{-1}$	non-Fickian	Fickian
	0.1331	35.8	14.2	0.84	0.031	$8.32\cdot10^{2}$	4.029	$4.31\cdot10^{-1}$	non-Fickian	Fickian
70	0.0630	69.9	0.1	0.07	0.968	$2.63\cdot10^{4}$	3.055	$1.98\cdot10^{0}$	non-Fickian	Fickian
(30µm)	0.0734	64.5	5.5	0.15	0.203	$5.53\cdot10^{3}$	3.064	$8.84\cdot10^{-1}$	non-Fickian	Fickian
	0.0838	59.3	10.7	0.35	0.061	$1.66\cdot10^{3}$	3.074	$6.14\cdot10^{-1}$	non-Fickian	Fickian
	0.0950	53.8	16.2	0.65	0.021	$5.83\cdot10^{2}$	3.085	$3.98\cdot10^{-1}$	non-Fickian	Fickian
	0.1063	48.3	21.7	1.50	0.009	$2.45\cdot10^{2}$	3.095	$3.83\cdot10^{-1}$	non-Fickian	Fickian
70	0.0658	68.5	1.5	0.04	0.623	$1.69\cdot10^{4}$	5.157	$2.55\cdot10^{-1}$	non-Fickian	Fickian
(50µm)	0.0766	62.9	7.1	0.11	0.137	$3.72\cdot10^{3}$	5.182	$1.52\cdot10^{-1}$	non-Fickian	Fickian
	0.0861	58.2	11.8	0.27	0.049	$1.32\cdot10^{3}$	5.206	$1.32\cdot10^{-1}$	non-Fickian	Fickian
	0.0975	52.5	17.5	0.55	0.017	$4.68\cdot10^{2}$	5.237	$9.38\cdot10^{-2}$	Fickian	Fickian
	0.1088	47.1	22.9	1.50	0.008	$2.07\cdot10^{2}$	5.267	$1.12\cdot10^{-1}$	non-Fickian	Fickian
	0.1201	41.8	28.2	2.00	0.004	$1.04\cdot10^{2}$	5.297	$7.44\cdot10^{-2}$	Fickian	Fickian
70	0.0663	68.2	1.8	0.05	0.569	$1.55\cdot10^{4}$	7.307	$1.42\cdot10^{-1}$	non-Fickian	Fickian
(70µm)	0.0769	62.8	7.2	0.16	0.133	$3.63\cdot10^{3}$	7.353	$1.07\cdot10^{-1}$	non-Fickian	Fickian
	0.0870	57.7	12.3	0.28	0.044	$1.20\cdot10^{3}$	7.403	$6.11\cdot10^{-2}$	Fickian	Fickian

	0.0980	52.3	16.7	0.65	0.020	$5.35 \cdot 10^{2}$	7.459	$6.25 \cdot 10^{-2}$	Fickian	Fickian
	0.1091	47.0	23.0	1.50	0.007	$2.04 \cdot 10^{2}$	7.515	$5.41 \cdot 10^{-2}$	Fickian	Fickian
	0.1201	41.8	28.2	2.50	0.004	$1.04 \cdot 10^{2}$	7.573	$4.55 \cdot 10^{-2}$	Fickian	Fickian

This information is available free of charge via the Internet at http://pubs.acs.org/.