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Recalculation of Some Reactivity Ratios

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ABSTRACT

In attempting to improve the evaluation of Q and e values, some 900 reactivity ratios were recalculated.

During an effort to determine Q and e values for vinyl monomers, the available original copolymerization references [1-368] were consulted. Where the experimental data were given, the reactivity ratios were recalculated by using the equations developed by Kelen and Tüdös [369, 370].

A consistent attempt was made to use all of the experimental data in the reactivity ratio calculations. If a data point was obviously out of line, it was discarded. When one of the r values was close to zero, data deletion was based on a criterion of maintaining a positive reactivity ratio.

The results from experimental data wherein no conversion data were given are underlined in the tabulation. When an obviously non-linear fit of the data resulted, the symbol " \sim " is shown rather than the meaningless calculated values. In a few cases the data were badly scattered or the initial monomer feeds were not sufficiently different to give meaningful results. This behavior is represented by the symbol "?" in Table 1.

Not all monomer pairs are cross-referenced under each monomer due to the ranking method used to develop the Q and e scheme. Some of the monomers found here are not in the Q and e listing due to the unavailability of reactivity ratios with three or more comonomers.

Although the original Russian references are listed, they were all read as their English translations.

It is hoped that the tabulation of reactivity ratios and the preceding listing of Q and e values [371] will prove to be beneficial to the synthetic polymer chemist.

E. 1. Reactivity Ratios for Free-Radical Vinyl Copolymerizations Recalculated by the Kelen-T₁ T₂ Method

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r ₂	r ₂	r ₂	
phthalene	Methyl methacrylate	[326]	1.7	1.0		0.98		
	N-Vinylcarbazole	[331]	7.0	0.12		6.62		
	N-Vinylpyrrolidone	[326]				~		
: acid, propenyl ester	Acrylonitrile	[108]	0.05	8.0		-0.084		
	Ethyl methacrylate	[210]	-	85.		-0.574		
	Methyl methacrylate	[210]	-	98.		-2.421		
: acid, 2-propenyl ester	Vinyl chloride	[100]	0.25	2.2		0.230		
	Maleic anhydride	[260]	0.032	0.002		0.034		
	Methyl methacrylate	[100]	0.017	30.		-0.90		
ene, phenyl-	Vinyl acetate	[100]	1.0	1.0		1.082		
	Methyl acrylate	[60]	0.27	0.62		0.272		
	Acrylonitrile	[60]	0.33	0.26		0.324		
ic acid, trimethyl ester	Methyl methacrylate	[357]	-	0.81		?		
	Styrene	[357]	-	0.34		0.338		
	2-Vinylpyridine	[192]	0.2	0.4		~		
	Acrylonitrile	[147]	-0.10	5.50		-0.481		

Butadiene	[147]	0.0	0.40	-0.002
Vinyl chloride	[147]	0.0	0.15	0.192
Vinylidene chloride	[149]	0.01	54.	0.152
Styrene	[147]	0.0	1.10	-0.013
Acrylamide	[207]	2.0	0.76	1.954
	[208]	1.6	0.6	1.586
Acrylic acid	[57]	2.40	0.05	2.498
	[57]	6.70	0.0	~
Butyl acrylate	[292]	1.6	0.6	2.286
	[291]	1.6	0.6	1.865
Ethyl acrylate	[292]	1.2	0.6	1.978
Methyl acrylate	[291]	1.2	0.6	1.385
	[207]	10.	0.2	2.540
	[292]	1.2	0.6	7.861
Acrylonitrile	[207]	1.09	0.77	1.163
	[207]	1.12	0.80	1.068
	[208]	1.60	0.52	1.515
Vinyl chloride	[271]	5.4	0.04	5.22
Methacrylonitrile	[208]			0.685
Methyl methacrylate	[291]	0.8	1.2	0.755
	[292]	0.5	1.0	0.589

(con)

E 1 (continued)

Monomer 2	Monomer 1	Ref	Original			Recalculated		
			r ₂	r ₁	r ₂	r ₂	r ₂	
Acrylamide	2-Vinylpyridine	[208]	4.0	0.0	2.638			
	Styrene	[291]	0.25	0.25	0.216			
		[292]			0.024			
Acrylamide, 2-methyl-	Vinyl acetate	[307]	0.33	0.22	0.320			
	Acrylonitrile	[207]	3.3	0.1	3.044			
	Methacrylonitrile	[91]	2.0	0.06	1.708			
	Styrene	[208]	1.78	0.40	1.776			
	Acrylic acid	[223]	0.88	0.22	0.832			
Acrylonitrile		[278]	0.48	1.73	0.465			
		[278]			1.358			
		[37]	0.60	1.43	0.598			
		[221]	1.38	0.36	1.085			
		[228]	1.04	0.94	0.870			
Crotonic acid		[228]			1.081			
		[330]			0.50			
		[298]	0.0	4.0	3.780			
		[298]	0.0	6.5	4.266			

Crotonic acid, cis-	[341]	-0.021	4.0	~
Crotonic acid, trans	[341]	-0.09	6.5	-0.85
Vinyl chloride	[156]	19.6	0.0	~
Methyl methacrylate	[314]	0.44	2.6	<u>0.53</u>
	[314]	2.45	2.55	<u>2.292</u>
Styrene	[314]	0.3	1.44	<u>0.332</u>
	[314]	1.38	1.27	<u>1.325</u>
	[295]	0.74	1.37	<u>0.585</u>
	[343]	9.14	0.67	<u>8.969</u>
Methyl methacrylate	[258]	0.206	4.22	<u>0.05</u>
	[258]	0.056	2.72	<u>0.03</u>
Styrene	[258]	2.41	0.18	<u>0.98</u>
Vinyl acetate	[205]	0.5	0.4	<u>0.351</u>
Acrylic acid	[315]	0.42	2.30	<u>0.591</u>
Methyl methacrylate	[170]	0.45	1.80	<u>0.41</u>
	[315]	0.51	2.04	<u>0.570</u>
Styrene	[170]	0.23	1.23	<u>0.12</u>
	[315]	1.28	0.44	<u>1.368</u>
	[315]	1.33	0.42	<u>1.321</u>

amide, 1-deoxy-D-
citol

amide, N,N-dimethyl-

: 1 (continued)

er 2	Monomer 1	Ref.	Original		Recalculated	
			r ₂	r ₁	r ₂	r ₁
amide, N-methylol- amide, N-octadecyl-	Vinyl chloride	[157]	23.5	0.0	~	
	Acrylonitrile	[119]	1.44	1.10	1.404	
	Vinylidene chloride	[119]	1.37	0.438	1.397	
	Methyl methacrylate	[290]	0.44	3.85	0.423	
	Styrene	[290]	0.2	1.41	0.540	
	Vinyl acetate	[119]	6.11	0.027	8.368	
	Styrene	[125]	0.07	0.25	0.14	
		[125]	0.13	0.75	0.12	
		[125]	0.14	0.90	0.14	
		[125]	0.15	0.70	0.16	
acid, 2-acetoxy-, 1 ester	Ethyl acrylate	[47]	0.15	1.03	0.07	
		[244]	0.15	0.25	0.14	
		[244]	1.0	1.0	0.968	
		[244]	0.65	1.65	0.609	
acid, benzyl ester	Methyl methacrylate	[244]	0.20	0.57	0.172	
	Styrene	[244]	5.4	0.08	5.635	
	Vinyl acetate	[244]	0.636	0.294	0.725	
	Acrylonitrile	[23]				

Methyl methacrylate	[277]	0.34	1.7	0.189
Styrene	[178]	0.2	0.55	0.196
	[277]	0.25	0.5	0.248
Acrylic acid	[252]	0.78	1.15	<u>0.91</u>
	[187]	1.07	0.58	<u>1.082</u>
Acrylonitrile	[233]	0.89	1.2	0.816
	[162]	1.005	1.003	0.894
	[118]	0.75	1.52	1.051
Butadiene	[257]	0.08	0.99	0.084
3-Buten-2-one	[53]	0.65	1.6	0.803
Ethylene	[42]	11.9	0.03	<u>13.94</u>
Vinylidene chloride	[118]	0.83	0.88	0.873
Methyl methacrylate	[87]	0.37	1.8	<u>0.43</u>
	[30]	0.20	1.74	<u>0.134</u>
2-Vinylpyridine	[78]	0.095	2.57	<u>0.11</u>
4-Vinylpyridine	[78]	0.46	5.15	<u>0.23</u>
Styrene	[20]			<u>0.293</u>
	[38]	0.34	1.03	0.184
	[19]	0.15	0.48	<u>-0.106</u>
Vinyl acetate	[301]	3.07	0.06	3.485

(con

TABLE 1 (continued)

Monomer 2	Monomer 1	Ref.	Original		Recalculated ^a	
			r ₂	r ₁	r ₂	r ₁
Acrylic acid, 2-chloro-, ethyl ester	Maleic anhydride	[117]	6.2	0.03	7.152	0.027
Acrylic acid, 2-chloro-, methyl ester	Acrylonitrile	[6]	2.0	0.15	1.762	0.122
Acrylic acid, 2-chloroethyl ester	Methyl methacrylate	[6]	1.2	0.3	1.140	0.309
	Styrene	[31]	2.0	0.15	1.925	0.115
		[74]			0.103	0.554
Acrylic acid, 2-cyano-, methyl ester	Methyl acrylate	[178]	0.12	0.43	0.139	0.494
	Acrylonitrile	[141]	1.2	0.1	0.327	0.024
Acrylic acid, 1,1-dihydro-perfluorobutyl ester	Methyl methacrylate	[141]	0.25	0.04	0.031	0.210
	Methacrylonitrile	[182]	0.13	0.10	0.135	0.068
	Styrene	[143]			0.15	0.18
	Butadiene	[141]	0.03	0.01	0.61	0.05
		[206]	0.07	0.35	0.073	0.358
	Methyl methacrylate	[206]	0.25	1.4	0.176	1.388

Styrene	[206]	0.07	0.33	0.049
Styrene	[126]	0.25	0.73	0.243
Acrylonitrile	[198]	0.93	1.12	0.81
Norbornadiene	[267]	3.05	0.01	2.39
Vinylidene chloride	[65]	0.8	0.5	0.720
Methyl methacrylate	[87]	0.24	2.03	-0.22
2-Vinylpyridine	[250]	0.19	0.23	0.21
Styrene	[178]	0.17	0.77	0.138
Styrene	[126]	0.29	0.91	0.312
Styrene	[151]	0.15	0.7	0.20
Styrene	[110]	0.16	1.0	0.14
Methyl methacrylate	[139]	0.18	0.75	0.18
Methyl methacrylate	[14]	0.20	0.75	0.96
Acrylonitrile	[234]	1.58	0.90	1.76
Methyl methacrylate	[234]	0.22	1.60	0.27
Styrene	[234]	0.115	0.58	0.12
Acrylonitrile	[290]	0.4	1.61	0.327
Styrene	[118]	0.68	1.74	1.036
Styrene	[233]	1.2	4.1	1.351

(con

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r ₂	r ₁	r ₂	r ₁
c acid, octadecyl ester	Vinylidene chloride	[118]	1.01	0.91	0.998			
	Methyl methacrylate	[290]	0.48	2.36	0.469			
c acid, octyl ester	Acrylonitrile	[118]	0.83	1.93	0.845			
	Vinylidene chloride	[118]	0.70	0.87	0.679			
c acid, 2-phenyl-, thyl ester	Styrene	[49]	0.13	0.02	1.276			
c acid, phenyl ester	Acrylonitrile	[363]			0.326			
c acid, sodium salt	Vinyl acetate	[37]			~			
c anhydride	Styrene	[219]	0.1	0.17	0.097			
	Methacrylonitrile	[219]	0.9	0.4	0.999			
	Allyl chloride	[219]			11.66			
	Styrene	[84]	0.02	0.45	0.005			
		[84]	0.02	0.47	-0.02			
		[227]	0.03	0.33	-0.01			
		[73]	0.03	0.52	0.70			
		[74]	0.03	0.41	0.04			
		[84]	0.05	0.38	0.03			
		[198]	0.058	0.398	0.007			

		[238]	0.07	0.37	<u>0.07</u>
	Vinyl chloride	[138]	0.04	0.41	<u>0.20</u>
		[288]	2.65	0.017	<u>3.042</u>
	Styrene	[220]	0.03	0.10	0.016
	Acrylonitrile	[45]	0.003	0.42	-0.006
	Methyl methacrylate	[45]	0.01	2.0	0.005
	Styrene	[45]	0.45	13.0	0.033
	p-Methylstyrene	[45]	0.05	11.8	0.060
	Vinyl acetate	[45]	2.0	0.1	4.022
	Butyl acrylate	[123]	0.163	3.76	0.126
	Ethyl acrylate	[123]	0.274	3.43	0.294
	Methyl acrylate	[123]	0.082	2.97	0.077
	Methyl methacrylate	[123]	0.071	3.81	0.110
	Ethyl acrylate	[267]	0.01	3.05	<u>-0.01</u>
	Acrylonitrile	[267]	0.08	0.67	<u>0.05</u>
		[69]	0.47	0.65	<u>0.43</u>
	Vinyl chloride	[267]	0.35	0.74	<u>0.41</u>
	Vinylidene chloride	[267]	0.08	1.41	<u>0.08</u>
	Methyl methacrylate	[267]	0.0	10.	<u>-0.50</u>
	p-Chlorostyrene	[188]	0.01	85.	0.00007

(con

E 1 (continued)

mer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r ₂	r ₁	r ₂	
1,2,5,6-tetrahydro-2,2,1-benzodioxole	Vinyl acetate	[188]	1.28	0.82	1.355			
	Butyl acrylate	[257]	0.99	0.08	1.048			
	Methyl acrylate	[257]	0.76	0.05	1.107			
	Acrylonitrile	[66]	0.18	0.03	0.20			
		[21]	0.40	0.04	0.359			
		[255]	0.48	0.16	0.504			
	Vinylidene chloride	[257]	1.9	0.05	1.942			
	Trichloroethylene	[89]	12.32	-0.007	9.64			
	Isoprene	[83]	0.75	0.85	0.138			
	Methacrylonitrile	[257]	0.37	0.08	0.400			
	Methyl methacrylate	[257]	0.53	0.06	0.526			
	Trimethyl aconitate	[147]	0.40	0.0	0.396			
	2-Methyl-5-vinyl-pyridine	[56]	1.30	0.412	1.289			
	Styrene	[159]	1.4	0.5	1.601			
		[21]	1.30	0.01	1.541			
		[140]	1.39	0.78	1.430			

	[56]	1.39	0.825	<u>1.385</u>
	[83]	1.83	0.65	1.831
p-Chlorostyrene	[255]	1.07	0.42	1.208
2,5-Dichlorostyrene	[8]	0.65	0.2	0.662
	[255]	0.46	0.46	0.451
<i>o</i> -Methylstyrene	[70]	1.20	0.18	1.499
Vinyl hendecanoate	[145]	37.9	0.015	22.72
Vinyl stearate	[145]	34.5	0.034	43.51
Methyl acrylate	[61]	11.1	0.078	10.41
Acrylonitrile	[61]	5.30	0.10	5.439
Isopropenyl methyl ketone	[259]	3.6	0.1	4.044
Methyl methacrylate	[61]	6.12	0.08	6.331
	[66]	3.9	0.18	2.527
Styrene	[61]	7.52	0.08	7.843
	[8]	7.0	0.05	6.015
Vinyl acetate	[247]	50.0	0.01	<u>33.52</u>
Vinyl formate	[247]	30.0	0.01	<u>11.91</u>
Acrylonitrile	[327]	3.2	0.30	<u>2.79</u>
2-Vinylpyridine	[327]	0.80	0.40	<u>0.69</u>
Styrene	[327]	0.56	0.12	0.546

(con

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r ₂	r ₁	r ₂	
tadiene, 2, 3-dichloro-	Chlorobutadiene	[122]	2.15	0.355	1.985			
	Methyl methacrylate	[61]	10.3	0.073	11.04			
tadiene, 2, 3-dimethyl-	Styrene	[61]	10.8	0.041	10.56			
	Butadiene	[83]	0.63	0.85	0.859			
tadiene, 2-fluoro-	Styrene	[173]	0.92	0.42	1.043			
	Acrylonitrile	[174]	0.50	0.07	0.605			
	Isoprene	[174]	2.05	0.19	2.642			
	Methyl methacrylate	[174]	1.54	0.64	1.231			
	Styrene	[174]	1.55	0.50	2.105			
tadiene, 2-methyl-	α -Methylstyrene	[174]	1.71	0.38	2.210			
	Butadiene	[83]	0.85	0.75	0.608			
	Fluorobutadiene	[174]	0.19	2.05	0.251			
	Methyl methacrylate	[302]	0.78	0.4	0.653			
	Styrene	[366]	1.92	0.50	1.924			
ene	Acrylonitrile	[366]	1.92	0.54	1.959			
	Vinyl chloride	[211]	0.10	8.0	0.209			
		[230]	0.21	3.4	0.11			

	Vinyl acetate	[211]	0.34	2.0	0.105
	Acrylonitrile	[211]	0.0	14.0(cis)	0.110
	Vinyl acetate	[211]	0.0	14.0	0.732
		[211]	0.07	8.0(cis)	0.028
		[211]	0.07	7.0	-0.031
n-2-one	Butyl acrylate	[53]	1.6	0.65	<u>1.806</u>
	Acrylonitrile	[140]	1.78	0.61	1.748
	Styrene	[140]	0.35	0.29	0.347
	Vinyl acetate	[91]	7.	0.05	0.467
n-2-one, 1-chloro-	Acrylonitrile	[356]	0.83	0.06	0.878
	Vinylidene chloride	[356]	6.30	0.02	6.765
	Methyl methacrylate	[356]	0.60	0.10	0.591
	α -Methylstyrene	[356]	0.45	0.02	0.385
	Vinyl acetate	[356]	50.0	0.01	54.85
n-2-one, 3-methyl-	Chlorobutadiene	[259]	0.1	3.6	0.146
	Vinylidene chloride	[47]	4.5	0.15	4.083
nic acid, diethyl-, l ester	Acrylic acid	[92]	0.09	5.55	-0.097
	Methyl acrylate	[92]	0.01	4.45	-0.027
	Maleic anhydride	[92]	0.035	0.003	0.024
	Styrene	[197]	0.03	32.	-0.087
	Vinyl acetate	[197]	0.25	1.8	0.126

(con)

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r ₂	r ₂	r ₁	r ₂
amic acid, vinyl-, yl ester	Acrylic acid	[81]						0.255
	N-Vinylpyrrolidone	[81]	0.42	2.				0.370
	Vinyl acetate	[81]	0.33	0.33				0.399
azole, N-vinyl-	Methyl acrylate	[98]	0.05	0.50				0.028
	Acrylonitrile	[269]	0.09	0.35				0.09
	Vinylidene chloride	[13]						3.641
	Methyl methacrylate	[98]	3.7	0.02				3.674
		[98]	0.04	2.0				0.031
		[11]	0.20	2.0				0.145
	Styrene	[11]	0.012	5.5				-0.022
		[98]	0.035	5.7				0.033
		[246]	2.68	0.126				2.66
azole, n-vinyl-	Vinyl acetate	[246]	4.22	0.196				4.15
	N-Vinylsuccinimide	[284]	0.3	1.05				0.042
	Ethylene	[52]	0.0	0.147				-0.149
n monoxide	Vinyl chloride	[51]	0.0	0.042				0.339
		[51]						-0.002
		[184]	0.15	13.47				0.130

Carboxylic acid, vinylene ester	Vinyl chloride	[319]	0.0	13.	0.003
		[319]			0.084
	Methyl methacrylate	[103]	0.09	5.2	0.033
	N-Vinylpyrrolidone	[103]	0.005	70.	-0.040
	Styrene	[103]	0.4	0.7	0.055
		[120]	0.0	20.	3.161
		[144]	0.058	3.71	-0.714
	Vinyl acetate	[120]	0.13	7.3	0.053
		[90]	0.15	4.0	0.058
		[103]	0.27	3.0	0.082
		[310]			0.300
Carboxylic acid, α -cyano-, ethyl ester	Acrylonitrile	[310]			~
Carboxylic acid anhydride	Styrene	[47]			0.021
Carboxylic acid, tripropenyl ester	Acrylonitrile	[367]	0.01	8.7	-0.074
	Vinyl chloride	[367]	0.40	1.90	1.031
	Styrene	[367]	0.03	53.0	0.076
	Vinyl acetate	[367]	1.29	0.76	2.961
Aldehyde	Vinyl chloride	[271]	0.02	1.93	-0.56
	N-Vinylpyrrolidone	[248]	0.03	0.5	-0.15

(con

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r ₂	r ₂	r ₁	r ₂
acetic acid	Vinylidene chloride	[47]	0.065	35.0	-0.194			
	N-Vinylpyrrolidone	[245]	0.02	0.85	0.00			
	Vinyl acetate	[94]	0.0	0.33	0.0009			
acetic acid, tripropenyl-		[47]	0.01	0.33	0.040			
	Methyl methacrylate	[201]	0.0	46.3	-0.003			
	Styrene	[201]	0.0	90.6	0.218			
opentene-1,3-dione	Vinyl acetate	[201]	0.62	0.71	1.288			
	Acrylonitrile	[95]	0.21	3.67	0.044			
	Vinylidene chloride	[264]	0.15	2.4	0.115			
ene	Methyl methacrylate	[95]	0.083	7.4	0.09			
	Styrene	[263]	0.415	0.024	0.120			
	p-Chlorostyrene	[264]	0.02	0.32	0.015			
ene	Butyl acrylate	[42]	0.03	11.9	0.013			
	Methyl acrylate	[41]	0.2	11.0	?			
	Vinyl chloride	[161]	0.08	4.70	0.02			
ene		[64]	0.16	1.85	0.16			
		[68]	0.16	1.85	0.23			

	[63]	0.2	1.85	0.213
	[42]	0.24	3.60	<u>0.343</u>
	[63]	0.285	1.13	<u>0.136</u>
	[180]	0.3	2.0	<u>0.183</u>
	[270]	0.3	2.0	<u>0.242</u>
Vinylidene chloride	[299]	0.03	15.2	<u>0.018</u>
Methyl methacrylate	[41]	0.2	17.	?
Vinyl acetate	[309]			<u>0.16</u>
	[68]	0.7	3.70	<u>0.67</u>
	[68]			<u>0.13</u>
	[41]	1.01	1.0	?
	[42]	1.07	1.08	<u>0.876</u>
Butyl acrylate	[268]	0.018	13.8	<u>0.18</u>
Acrylonitrile	[268]	0.007	0.94	<u>0.06</u>
Methyl methacrylate	[268]	0.0024	27.4	<u>0.12</u>
	[34]	0.05	25.	<u>0.052</u>
	[34]	0.05	20.	<u>0.051</u>
Styrene	[368]	0.038	12.6	<u>0.09</u>
	[34]	0.05	23.0	<u>0.016</u>
Vinyl acetate	[158]	4.5	0.35	5.278
	[268]	1.82	0.68	<u>1.91</u>

(con

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r	r ₂	r ₁	r
ene, chloro-	Acrylic acid	[288]	0.025	6.4		0.021		
		[229]	0.027	8.2		<u>0.05</u>		
	Methyl acrylate	[135]	0.107	6.8		0.106		
		[46]	0.083	9.		0.002		
	Acrylonitrile	[151]	0.12	4.4		0.092		
		[140]	0.02	3.28		0.0002		
		[22]	0.04	2.7		<u>0.023</u>		
		[202]	0.02	3.28		<u>0.073</u>		
		[238]	0.052	3.6		0.044		
		[46]	0.074	3.7		0.052		
Vinylene carbonate		[319]	13.	0.0		17.59		
		[319]				15.81		
Ethylene		[180]	0.0	1.2		<u>2.004</u>		
		[68]	1.85	0.16		<u>1.63</u>		
		[63]	1.85	0.2		<u>1.85</u>		
		[270]	2.	0.3		<u>1.745</u>		
		[161]	4.70	0.08		<u>3.82</u>		

	[63]	1.13	0.285	<u>0.963</u>
	[64]	1.85	0.16	<u>1.55</u>
	[42]	3.60	0.24	<u>4.378</u>
Vinylidene chloride	[67]	0.23	3.15	<u>0.204</u>
	[29]	0.5	7.5	<u>0.136</u>
	[3]	0.14	1.0	<u>0.25</u>
	[238]			<u>0.071</u>
Methyl methacrylate	[3]	0.13	8.30	0.062
Trimethyl aconitate	[147]	0.15	0.0	0.035
Isobutylene	[140]	2.05	0.08	2.049
	[155]	2.11	0.34	2.12
4-Vinylpyridine	[154]	0.02	23.4	~
N-Vinylloxazolidone	[36]	0.84	0.35	0.312
Styrene	[59]	0.02	17.	-0.005
	[238]			0.060
	[46]	0.077	35.	0.016
	[109]	0.08	28.	-0.058
	[242]	0.17	32.	<u>0.16</u>
Vinyl acetate	[158]	1.68	0.23	1.844
	[283]	2.	0.28	2.138

(con

E 1 (continued)

Monomer 2	Monomer 1	Original				Recalculated	
		Ref.	r ₂	r ₁	r ₂	r ₁	r ₂
ene, chloro- (continued)	Vinyl acetate (continued)	[3]	2.1	0.3	1.644		
		[86]	2.45	0.30	<u>2.30</u>		
		[148]	1.8	0.6	1.034		
		[109]	1.60	0.3	1.632		
		[283]	1.8	0.3	1.662		
	Vinyl benzoate	[145]	1.06	0.358	1.080		
	Vinyl hendecanoate	[146]	0.963	0.248	0.031		
	Vinyl stearate	[145]			0.718		
ene, chlorotrifluoro-	Methyl methacrylate	[236]	0.005	75.	-0.073		
	Isobutylene	[318]	0.0	0.04	<u>0.01</u>		
	Styrene	[236]	0.001	7.	-0.101		
	Vinyl acetate	[236]	0.01	0.6	-0.017		
ene, 1, 1-dichloro-	Acrylic acid	[288]	0.46	1.26	0.437		
	Butyl acrylate	[118]	0.88	0.83	0.935		
	Ethyl acrylate	[65]	0.5	0.8	0.578		
	Methyl acrylate	[107]	0.3	1.1	0.897		

Acrylonitrile	[138]	0.37	0.91	0.357
	[238]			0.28
Butadiene	[257]	0.05	1.9	-0.43
N-Vinylcarbazole	[98]	0.02	3.7	-0.006
	[13]			-0.019
Crotonic acid	[47]	35.	0.065	18.82
Isopropenyl methyl ketone	[47]	0.15	4.5	0.134
Ethylene	[299]	15.2	0.03	15.92
Vinyl chloride	[67]	3.15	0.23	3.063
	[29]	7.5	0.5	3.394
	[3]	1.	0.14	8.92
	[238]			2.058
Butyl methacrylate	[3]	0.35	0.22	0.350
Ethyl methacrylate	[3]	0.35	0.22	0.348
Methyl methacrylate	[65]	0.09	2.1	0.094
	[138]	0.24	2.53	0.264
	[324]	0.4	2.5	0.185
	[324]	0.5	2.54	0.356
N-Vinyloxazolidone	[102]	1.35	0.08	1.418
Allyl chloride	[3]	3.8	0.26	3.495

E 1 (continued)

Monomer 2	Monomer 1	Ref	Original		Recalculata	
			r ₂	r ₁	r ₂	r ₁
ne, 1, 1-dichloro- (continued)	Styrene	[59]	0.085	1.85	0.087	0.087
		[93]	0.12	1.75	<u>0.108</u>	0.108
		[138]	0.14	2.0	0.134	0.134
		[238]	0.145	2.1	0.098	0.098
	Vinyl acetate	[3]	6.	0.1	4.734	4.734
		[59]	3.55	0.02	3.498	3.498
	Vinyl hendecanoate	[145]	2.58	0.054	2.732	2.732
	Vinyl 12-ketostearate	[146]	4.0	0.0	4.322	4.322
	Vinyl stearate	[145]	3.80	0.075	3.924	3.924
	Trimethyl aconitate	[149]	54.	0.01	<u>64.60</u>	64.60
	Styrene	[137]			-2.195	-2.195
ne, cis-1, 2-dichloro-		[9]			0.016	0.016
	Vinyl acetate	[9]	0.0	2.8	0.091	0.091
		[137]			0.010	0.010
ne, trans-, 1,2-dichloro-	Styrene	[137]			-3.12	-3.12
		[9]			0.093	0.093
	Vinyl acetate	[9]			0.058	0.058

ene, 1,1-dicyano-	[137]				0.072
Acrylic acid	[82]	0.29	0.26		0.288
Chlorobutadiene	[82]	0.0017	0.010		-0.030
Vinyl chloride	[82]	0.54	0.017		0.600
Vinylidene chloride	[82]	0.049	0.012		0.049
Methyl methacrylate	[82]	0.031	0.046		0.028
Allyl chloride	[82]				0.204
Styrene	[134]	0.7	0.02		0.72
	[82]	0.001	0.005		0.001
2, 5-Dichlorostyrene	[82]	0.0092	0.031		0.005
	[82]				0.007
Vinyl acetate	[82]	0.11	0.0054		0.103
Vinyl benzoate	[82]	0.10	0.008		0.061
Methyl acrylate	[334]				-0.241
	[334]				0.192
Acrylonitrile	[143]	0.0	0.028		-0.02
Chlorobutadiene	[61]	0.0	3.17		0.030
Methacrylonitrile	[143]	0.0	0.33		-0.45
Styrene	[282]	0.0	0.34		0.006
Ethylene	[42]	0.16	4.39		0.009
ene, fluoro-					

(co

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r	r ₂	r	r
ene, tetrachloro-	Styrene	[40]	0.0	165.		~		
	Vinyl acetate	[40]	0.0	208.		~		
ene, trichloro-	Vinyl acetate	[3]	0.0	5.0		-0.076		
	Butadiene	[59]	0.0	6.8		5.194		
	Styrene	[89]	-0.007	12.32		-0.03		
	Vinyl acetate	[59]	0.0	16.		-0.004		
ene, vinyl-	Vinyl acetate	[9]	0.0	0.67		-0.006		
	Methyl acrylate	[158]	0.01	0.66		-0.056		
	N-Vinylpyrrolidone	[294]	0.82	0.63		0.164		
	Styrene	[308]	0.66	0.4		0.707		
ic acid, diethyl ester	Styrene	[294]	0.08	2.5		0.149		
	Chlorobutadiene	[294]	0.2	4.		0.196		
	Ethylene	[61]	0.027	6.65		0.017		
	Vinyl chloride	[41]	10.	0.25		0.756		
Vinylidene chloride	Vinyl chloride	[137]	0.47	0.12		0.480		
	Methyl methacrylate	[59]	0.046	12.2		0.044		
Methyl methacrylate	Vinylidene chloride	[28]	0.03	40.4		0.038		

Styrene	[249]	0.05	0.31	0.003
Vinyl acetate	[137]	0.444	0.011	0.444
Methyl methacrylate	[191]	0.01	3.5	-0.064
Styrene	[137]	0.0	0.19	-0.016
	[199]	0.0	0.30	-0.006
	[77]	0.0	0.09	~
	[191]	0.01	0.23	~
α -Methylstyrene	[77]	0.0	0.022	-0.010
Methyl methacrylate	[199]	0.10	1.25	0.119
Styrene	[199]	0.0	0.45	-0.024
Methyl acrylate	[5]	3.17	0.27	3.197
Acrylonitrile	[4]	4.05	0.20	4.027
Methyl methacrylate	[5]	1.82	0.465	1.762
Styrene	[4]	0.84	0.21	0.847
Vinyl acetate	[4]	32.	0.013	~
Methyl acrylate	[60]	0.0	8.5	?
Acrylonitrile	[60]	0.0	12.2	?
Vinyl chloride	[329]	-	2.5	?
Acrylonitrile	[339]	3.60	0.015	3.740
N-Vinylpyrrolidone	[339]	5.38	0.020	5.667
Styrene	[339]	1.70	0.090	1.666

(con

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r	r ₂	r	r
quinone, vinyl-	Acrylic acid	[337]	0.08	0.35	-0.056			
	Acrylonitrile	[337]	0.02	0.46	0.041			
ole, 2-methyl-1-vinyl-	Methyl methacrylate	[337]	0.17	0.62	0.026			
	4-Vinylpyridine	[337]	0.05	0.58	~			
ole, 1-vinyl-	Vinyl chloride	[154]	2.13	0.22	2.22			
	Methyl methacrylate	[364]	0.06	3.7	0.045			
ole, 1-vinyl-	Styrene	[364]	0.10	8.66	0.089			
	Methyl methacrylate	[364]	0.03	4.1	0.012			
ate, 2-propenyl-	N-Vinylpyrrolidone	[364]	0.95	0.17	0.957			
	Styrene	[364]	0.10	10.0	0.068			
ole, 1-vinyl-	Vinyl acetate	[364]	1.50	0.2	1.897			
	Acrylonitrile	[360]	0.03	0.25	0.092			
ate, 2-propenyl-	Vinylidene chloride	[6]	0.03	0.40	0.069			
	Vinyl acetate	[360]	8.0	0.10	8.558			
ate, 2-propenyl-	Methyl acrylate	[99]	0.08	0.8	0.079			
	Styrene	[99]	0.14	7.0	0.121			

uric acid, tripropenyl-	Methyl methacrylate	[201]	0.0	48.9	-0.489
	Styrene	[201]	0.0	87.6	-0.051
	Vinyl acetate	[201]	0.70	0.95	1.962
ic acid	Acrylonitrile	[164]	1.57	0.25	0.865
	Styrene	[76]	0.2	0.3	0.116
ic acid, dibutyl ester	Styrene	[39]	0.38	0.4	0.345
ic acid, diethyl ester	Styrene	[39]	0.33	0.30	0.337
ic acid, dimethyl ester	Styrene	[39]	0.25	0.32	-0.235
ic anhydride	Acrylonitrile	[365]			4.852.
	Styrene	[62]			0.629
		[62]			0.785
		[365]			0.408
	Vinyl acetate	[365]			~
acid, diethyl ester	N-Vinylcarbazole	[361]	0.0	0.27	0.0004
	Vinyl chloride	[6]	0.0	0.9	0.046
		[137]	0.009	0.77	0.006
	Methyl methacrylate	[28]	-0.10	354.	-0.10
	Styrene	[139]	0.0	5.48	-0.006
		[139]	0.01	6.52	0.101
		[14]	0.0	5.	~
		[139]	0.005	6.52	0.086

(con

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r	r ₂	r	r
acid, diethyl ester (continued)	Vinyl acetate	[137]	0.043	0.17		0.042		
acid, dimethyl ester	N-Vinylcarbazole	[361]	0.0	0.27	~			
	Styrene	[137]				0.146		
acid, dioctyl ester anhydride	N-Vinylsuccinimide	[317]				0.105		
	Vinyl chloride	[284]				-0.012		
	Allyl acetate	[3]	0.42	0.0	0.631			
	Methyl acrylate	[27]	0.13	0.0075	0.007			
	Vinyl chloride	[260]	0.0	2.8	0.011			
	Methyl methacrylate	[260]	0.008	0.296	-0.220			
Styrene		[33]	0.03	3.5	0.018			
		[169]	-0.18	4.63	-0.20			
		[320]	0.5	1.	0.08			
		[17]	0.0	0.019	0.003			
		[12]	0.0	0.042	-0.0001			
		[241]	0.035	0.012	0.021			
		[105]	0.0	0.097	0.001			

	[241]	0.035	0.012	0.021
N-Vinyl succinimide	[284]	0.03	0.15	0.021
Vinyl acetate	[260]	0.003	0.055	-0.058
Vinylidene chloride	[251]	0.48	0.71	0.464
Methyl methacrylate	[251]	0.17	2.5	0.165
Styrene	[251]	0.1	0.1	0.087
Vinyl chloride	[305]	0.04	2.08	12.49
Methyl methacrylate	[115]	0.12	1.33	-0.104
Styrene	[115]			-0.066
Methyl methacrylate	[348]	0.17	2.02	0.106
Styrene	[348]	0.08	0.0	0.088
Methyl methacrylate	[323]	0.26	1.5	0.200
N-Vinylpyrrolidone	[323]	0.07	0.02	0.004
Styrene	[323]	0.01	0.04	0.011
Vinyl acetate	[323]	0.86	0.05	0.608
Vinyl chloride	[306]	4.37	0.03	4.010
Methyl methacrylate	[328]	0.183	1.022	0.179
Styrene	[328]	0.047	0.012	0.045
Vinyl acetate	[328]	1.269	0.0	1.265
Methyl methacrylate	[201]	0.0	28.9	-0.659

(co

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r	r ₂	r	r
Acrylamide, dipropenyl- (continued)	Styrene	[201]	0.0	103.0		-0.320		
	Vinyl acetate	[201]	0.19	1.40		0.315		
	Methacrylic acid	[55]	0.22	2.0		0.200		
Acrylamide		[190]	0.03	2.0		0.326		
	Methyl methacrylate	[316]	0.43	1.68		<u>0.436</u>		
		[54]	0.47	1.5		<u>0.426</u>		
		[316]	1.27	1.55		<u>1.272</u>		
Acrylamide, N-phenyl-	Styrene	[316]	0.54	1.44		<u>0.485</u>		
		[316]	1.29	1.46		<u>1.244</u>		
		[352]	0.60	0.35		<u>0.712</u>		
Acrylic acid	Acrylonitrile	[352]	0.63	1.51		0.566		
	Methyl methacrylate	[352]	0.71	1.42		0.88		
	Styrene	[187]	1.31	0.35		<u>1.247</u>		
Acrylamide	Acrylonitrile	[216]	2.5	0.093		<u>2.390</u>		
		[16]				0.194		
	Chlorobutadiene	[259]	0.15	2.7		-0.035		
	Vinyl chloride	[135]	23.8	0.034		23.70		

	[229]	36.	0.027	23.59
Butyl methacrylate	[224]	0.53	1.11	<u>0.734</u>
	[187]	0.75	1.20	<u>0.798</u>
Glycidyl methacrylate	[224]	0.85	1.18	<u>0.982</u>
Methyl methacrylate	[203]	0.68	0.98	<u>2.162</u>
	[216]	0.92	0.60	0.993
	[276]	1.33	0.12	<u>0.480</u>
	[312]	0.68	0.98	<u>1.84</u>
	[210]	-	1.66	<u>1.630</u>
	[54]	4.5	0.3	1.260
	[313]	1.6	0.3	<u>1.38</u>
	[276]	1.63	0.35	<u>1.176</u>
Methacrylonitrile	[44]	1.63	0.59	<u>1.739</u>
	[85]	1.64	0.62	<u>0.54</u>
2-Vinylpyridine	[15]	0.58	1.55	0.581
Styrene	[166]	0.47	0.45	0.549
	[313]	0.62	0.2	<u>0.56</u>
	[312]	0.45	0.53	<u>0.49</u>
	[47]	0.7	0.15	0.604
rylic acid, benzyl ester Acrylonitrile	[23]	0.810	0.206	<u>0.962</u>

(con

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r ₂	r ₂	r ₁	r ₂
Acrylic acid, benzyl ester (continued)	Methyl methacrylate	[111]	1.14	0.85	1.116	0.674		
	Phenyl methacrylate	[32]						
	Styrene	[179]	0.51	0.44	0.434	0.66		
Acrylic acid, butyl ester	Acrylic acid	[187]	3.67	0.29	3.532	0.984		
	Acrylonitrile	[165]	1.08	0.31	2.064	1.154		
	Vinylidene chloride	[3]	0.22	0.35	1.264	0.848		
	Methacrylic acid	[224]	1.11	0.53	2.114	0.750		
	Glycidyl methacrylate	[187]	1.20	0.75	0.310	2.515		
Acrylic acid, 2-chloro- butyl ester	Methyl methacrylate	[224]	0.79	0.94	30.84	1.085		
	Methyl methacrylate	[30]	1.27	0.79				
	Methacrylonitrile	[44]	0.69	0.51				
	Styrene	[179]	0.40	0.56				
	Vinyl acetate	[43]	0.67	0.97				
Acrylic acid, 2-chloro- butyl ester	Vinyl acetate	[165]	28.8	0.023				
	Butyl methacrylate	[179]	1.10	0.85				
	Isobutyl methacrylate	[179]	1.07	0.88				

	Methyl methacrylate	[179]	1.13	0.88	1.156
	Styrene	[179]	0.46	0.33	0.34
	Methacrylic acid	[16]			2.321
acrylic acid, diethyl- monoethyl ester	Acrylonitrile	[335]	1.32	0.19	1.336
	Vinyl chloride	[335]	25.3	0.037	<u>18.47</u>
acrylic acid, 1-(3,5- ethyladamantyl) ester	Methyl methacrylate	[335]	0.45	0.70	<u>0.448</u>
	Styrene	[335]	0.64	0.90	<u>0.629</u>
	Acrylonitrile	[114]	1.32	0.14	<u>0.850</u>
	Methacrylic acid	[224]	1.18	0.85	<u>1.195</u>
acrylic acid, 2,3-epoxy- propyl ester	Butyl methacrylate	[224]	0.94	0.79	<u>0.942</u>
	Methyl methacrylate	[113]	0.88	0.76	<u>0.519</u>
	Styrene	[226]	0.94	0.75	<u>0.931</u>
		[114]	0.53	0.44	<u>0.155</u>
		[225]	0.60	0.50	<u>0.459</u>
		[217]	0.63	0.34	<u>0.538</u>
	Vinylidene chloride	[3]	0.22	0.35	2.170
acrylic acid, ethyl ester	Methyl methacrylate	[87]	0.98	1.09	<u>1.00</u>
		[32]	1.08	0.92	<u>0.860</u>
	Methacrylonitrile	[44]	0.83	0.46	<u>0.827</u>
	Styrene	[179]	0.41	0.53	<u>0.361</u>

(con

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r ₂	r ₁	r ₂	r ₁
acrylic acid, ferrocenyl-ethyl ester	Acrylonitrile	[325]						0.826
	Methyl acrylate	[293]	0.08	0.82				0.043
	Methyl methacrylate	[293]	0.12	3.27				0.064
	N-Vinylpyrrolidone	[325]						3.576
acrylic acid, 2-hydroxyethyl ester	Styrene	[293]	0.03	3.7				-0.019
	Butyl acrylate	[293]	0.03	3.7				-0.016
	Ethyl acrylate	[359]	5.414	0.168				4.764
	Methyl acrylate	[359]	13.526	0.358				11.22
acrylic acid, 2-hydroxyethyl ester	Methyl methacrylate	[359]	7.141	0.012				8.696
	2-Vinylpyridine	[350]	0.66	0.86				0.629
	4-Vinylpyridine	[342]	0.72	0.75				0.563
	Styrene	[342]	0.66	0.95				0.619
acrylic acid, 2-hydroxyethyl ester	Styrene	[346]	0.53	0.45				0.538
	Butyl acrylate	[350]	0.85	0.33				0.856
	Ethyl acrylate	[333]						5.360
		[333]						13.32

Methyl acrylate	[333]				<u>7.369</u>
Methyl methacrylate	[333]				<u>1.055</u>
Acrylonitrile	[165]	1.04	0.21		<u>1.046</u>
Methyl methacrylate	[30]	1.09	0.91		<u>1.882</u>
Methacrylonitrile	[44]	0.67	0.73		<u>0.679</u>
Vinyl acetate	[165]	29.8	0.025		<u>34.86</u>
Methacrylonitrile	[44]	0.92	0.43		<u>0.944</u>
Acrylic acid, isobutyl ester	[287]	0.35	0.35		<u>0.48</u>
Acrylic acid, methyl ester	[287]	0.39	0.44		<u>0.48</u>
Acrylic acid, isopropyl ester	[254]	0.44	0.50		<u>0.44</u>
Acrylic acid, n-butyl ester	[262]	0.46	0.48		<u>0.47</u>
Acrylic acid, isopropyl ester	[287]	0.46	0.57		<u>0.41</u>
Acrylic acid, n-butyl ester	[287]	0.49	0.48		<u>0.37</u>
Acrylic acid, isopropyl ester	[254]	0.50	0.56		<u>0.56</u>
Acrylic acid, n-butyl ester	[171]	0.8	0.8		<u>0.14</u>
Acrylic acid, isopropyl ester	[112]	0.588	0.545		<u>0.58</u>
Acrylic acid, n-butyl ester	[139]	0.536	0.590		<u>0.49</u>
Acrylic acid, isopropyl ester	[243]	0.57	0.51		<u>0.51</u>
Acrylic acid, n-butyl ester	[243]	0.54	0.43		<u>0.55</u>
Acrylic acid, isopropyl ester	[324]	0.056	0.25		<u>0.44</u>
Acrylic acid, n-butyl ester	[262]	0.55	0.60		<u>0.54</u>

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original		Recalculated	
			r ₂	r ₁	r ₂	r ₁
Acrylic acid, octyl ester	Methacrylonitrile	[44]	0.58	0.75	0.613	0.613
	Styrene	[179]	0.55	0.67	0.557	0.557
	Styrene	[177]	0.60	0.30	0.483	0.483
Acrylic acid, phenyl ester	Styrene	[179]			0.546	0.546
	Methacrylic acid	[359]	1.0	0.83	0.806	0.806
	Methyl methacrylate	[359]	3.34	0.67	7.157	7.157
Acrylic anhydride	Styrene	[359]	1.5	0.22	-0.202	-0.202
	Methacrylonitrile	[219]	1.6	0.27	1.448	1.448
	Methyl methacrylate	[275]	1.7	0.22	1.578	1.578
Acrylonitrile	Styrene	[219]	0.26	0.12	0.268	0.268
	Chloroethyl vinyl ether	[92]			6.685	6.685
Acrylonitrile	Styrene	[140]	0.16	0.30	0.26	0.26
	Styrene	[44]	0.26	0.38	0.25	0.25
	Styrene	[311]	0.32	0.39	0.33	0.33
Acrylonitrile	Acrylonitrile	[119]	0.118	3.61	0.023	0.023
	Vinylidene chloride	[119]	0.0	5.23	-0.244	-0.244
	Vinyl acetate	[119]	0.532	0.74	0.684	0.684

idone, N-vinyl-	Vinyl chloride	[36]	0.35	0.84	0.822
	Vinylidene chloride	[102]	0.08	1.35	0.091
	Methyl methacrylate	[102]	0.03	6.0	0.038
		[36]	0.035	9.6	0.027
	Styrene	[36]	1.50	0.60	-0.030
	Vinyl acetate	[36]	1.90	0.52	2.051
		[102]	1.50	0.60	1.560
ene	Vinyl chloride	[3]			0.0002
ene-3-one	Styrene	[344]	0.45	0.22	<u>0.43</u>
		[353]	0.31	0.45	0.332
ene-3-one, 2,2-ethyl-	Styrene	[344]	2.42	0.24	<u>3.20</u>
		[353]	0.30	0.40	0.248
ene-3-one, 2-methyl-	Styrene	[344]			<u>0.26</u>
		[353]	0.30	0.40	0.27
vinyl ketone	Styrene	[344]			<u>0.30</u>
		[353]	0.48	0.21	0.466
onic acid, vinyl-, (2-chloroethyl) ester	Styrene	[133]	0.03	2.43	0.032
onic acid, vinyl-, ethyl ester	Styrene	[129]	0.0	4.1	0.315
		[18]	0.0	3.25	-0.294

(con

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r	r ₂	r	r
thonic acid, <i>o</i> -phenylvinyl-	Acrylic acid	[132]	0.44	0.98	0.045	0.045		
	Acrylonitrile	[132]	0.32	0.69	-0.451	-0.451		
ic acid, dipropenyl ester	Methacrylic acid	[130]	0.36	3.5	0.166	0.166		
	Methyl methacrylate	[130]	0.06	3.3	-0.063	-0.063		
ic acid, dipropenyl ester	Methyl acrylate	[297]	0.05	11.5	0.028	0.028		
		[297]	0.058	12.9	0.038	0.038		
Acrylonitrile		[153]	0.049	2.54	0.040	0.040		
		[153]	0.057	3.72	0.036	0.036		
Vinyl chloride		[296]	0.38	1.68	0.701	0.701		
Methyl methacrylate		[153]	0.07	25.	-0.0008	-0.0008		
		[153]	0.074	20.8	0.029	0.029		
Styrene		[153]	0.113	17.5	0.078	0.078		
		[152]	0.053	21.4	0.041	0.041		
Vinylacetate		[152]	0.057	32.8	0.026	0.026		
		[152]	0.066	19.4	0.037	0.037		
Vinylacetate		[297]	0.93	0.83	1.666	1.666		
		[297]	1.2	0.72	2.195	2.195		

ene	Acrylic acid	[183]	0.0	9.7	~
	Vinyl chloride	[155]	0.3	2.27	0.20
	Chlorotrifluoro- ethylene	[355]	0.005	5.629	<u>-0.023</u>
		[318]	0.24	0.01	<u>0.08</u>
ene, 2-chloro-	Acrylonitrile	[181]	0.01	1.4	-0.024
	Vinyl chloride	[181]	5.21	0.18	4.812
	Vinyl acetate	[181]	1.84	0.22	1.650
ene, 3-chloro-	Acrylonitrile	[108]	0.0	1.0	-0.152
		[47]	0.05	3.0	0.080
	Vinylidene chloride	[3]	0.26	3.8	0.232
	Styrene	[204]	-	30.	<u>-6.93</u>
		[10]	0.016	31.5	0.061
	Vinyl acetate	[3]	0.67	0.7	0.611
ene, 2,3-dichloro-	Methyl methacrylate	[11]	0.017	5.5	<u>0.180</u>
	Styrene	[11]	0.06	5.0	<u>0.048</u>
ene, 3-hydroxy-	Acrylonitrile	[108]	0.0	0.6	<u>0.0001</u>
		[176]	0.11	3.96	<u>0.099</u>
	Ethyl methacrylate	[300]	0.01	1.6	0.127
	Methyl methacrylate	[210]	-	108.	<u>-0.025</u>
		[210]	-	91.	<u>-1.615</u>

(con

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r ₂	r ₂	r ₂	
Styrene, 2-methyl-	Acrylonitrile	[21]	0.02	1.8	0.0003			
		[211]	0.0	0.80	0.023			
	Vinyl chloride	[140]	0.08	2.05	0.055			
Styrene, 3-phenyl-	Chlorotrifluoroethylene	[155]	0.34	2.11	0.27			
		[318]	0.04	0.0	0.06			
Styrene, 3-(2-vinyl)-6-phenyl-	Vinyl acetate	[211]	0.31	2.15	0.165			
	Methyl acrylate	[351]	0.0	12.9	-0.035			
	Acrylonitrile	[351]	0.0	5.1	0.026			
		[24]	0.0	3.5	-0.053			
Styrene, 3-(2-vinyl)-6-phenyl-	Methacrylonitrile	[351]	0.0	18.2	-0.061			
	Acrylonitrile	[340]			0.19			
	Methyl methacrylate	[340]	0.47	0.71	0.56			
	Styrene	[340]	0.90	0.90	0.85			
Styrene, 3-(2-vinyl)-6-phenyl-4,5-dihydro-	Acrylonitrile	[340]			0.02			
	Methyl methacrylate	[340]	0.11	1.20	0.08			
Styrene		[340]	0.13	5.20	0.13			

ne, 5-ethyl-2-vinyl-	[231]	1.16	0.179	<u>1.318</u>
Acrylonitrile	[50]			<u>0.428</u>
Methyl methacrylate	[231]	0.69	0.395	<u>0.675</u>
Styrene	[231]	1.2	0.79	<u>1.094</u>
ne, 2-methyl-5-vinyl-	[232]	0.88	0.172	<u>0.996</u>
Acrylonitrile	[232]	0.27	0.16	<u>0.310</u>
Butadiene	[56]	0.412	1.30	<u>0.409</u>
Methyl methacrylate	[232]	0.61	0.46	<u>0.542</u>
Styrene	[56]	0.801	0.738	<u>0.785</u>
	[232]	0.91	0.812	<u>0.749</u>
Butyl acrylate	[78]			<u>2.59</u>
Ethyl acrylate	[250]	0.23	0.19	<u>0.21</u>
Methyl acrylate	[231]	1.58	0.168	<u>1.718</u>
	[2]	2.03	0.20	<u>2.131</u>
Acrylonitrile	[50]			<u>0.439</u>
Methyl methacrylate	[6]	0.70	0.33	<u>0.761</u>
Styrene	[231]	0.77	0.439	<u>0.729</u>
2,5-Dichlorostyrene	[231]	0.9	0.56	<u>0.749</u>
2,5-Dichlorostyrene	[2]	1.1	0.9	<u>0.618</u>
Vinyl acetate	[6]	12.8	-0.12	<u>13.82</u>

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	[121]	2.28	0.237	<u>1.754</u>
	[36]	3.3	0.205	<u>3.398</u>
	[253]	2.45	0.44	2.517
	[237]	0.0	6.0	0.447
	[237]	0.0	0.8	0.094
	[209]	0.0	22.	-0.167
	[256]	0.99	0.695	<u>1.047</u>
	[256]			<u>0.987</u>
	[128]	1.1	0.60	<u>1.103</u>
	[128]	1.1	0.43	<u>1.151</u>
	[175]	1.8	0.076	1.637
	[266]	0.4	1.20	<u>4.878</u>
	[266]	0.28	1.04	<u>0.754</u>
	[168]	0.60	1.20	0.354
	[6]	0.12	0.7	0.101
	[188]	85.	0.01	72.66
	[255]	0.42	1.07	1.573
	[150]	0.8	0.4	0.772
	[139]	1.025	0.74	1.027
	[139]	1.042	0.816	1.064
	[128]	1.1	0.66	<u>1.082</u>
trimethoxy vinyl				
Vinyl benzoate				
Acrylonitrile				
Vinyl chloride				
Styrene				
Styrene				
e, p-bromo-				
e, p-carboxy-				
e, m-chloro-				
e, o-chloro-				
e, p-chloro-				

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated			
			r ₂	r ₁	r ₂	r ₁	r ₂	r ₁	
e, p-chloro- (continued)	Styrene (continued)	[150]							
	p-Methoxystyrene	[128]	0.7	0.48				0.747	0.466
	α -Methylstyrene	[218]	1.48	0.25				1.559	
e, p-cyano-	Styrene	[128]	1.2	0.19				1.222	
	p-Chlorostyrene	[128]	1.4	0.34				1.275	
	p-Methoxystyrene	[128]	0.85	0.093				0.891	
e, 2,5-dichloro-	Methyl acrylate	[2]	4.27	0.25				4.485	
		[136]	3.4	0.15				2.788	
	Acrylonitrile	[84]	0.07	0.22				0.08	
	Butadiene	[8]	0.2	0.65				0.186	
		[255]	0.46	0.46				0.478	
	Methyl methacrylate	[3]	2.25	0.44				2.660	
	2-Vinylpyridine	[2]	0.9	1.1				0.138	
	Styrene	[84]	0.05	0.40				0.14	
		[14]	0.8	0.2				0.805	
e, m-hydroxy-	Styrene	[35]	1.21	0.91				1.329	
e, p-methoxy-	Styrene	[128]	0.85	1.0				0.691	

e, m-methyl-	[160]	0.93	1.13	1.014
p-Chlorostyrene	[128]	0.48	0.70	0.406
Methyl methacrylate	[256]	0.49	0.53	0.484
Styrene	[261]	0.96	0.83	0.993
Acrylonitrile	[265]	0.11	0.03	0.142
	[75]	0.1	0.06	0.089
	[75]			0.103
	[171]	0.2	0.04	0.08
	[94]	0.055	-	0.08
Butadiene	[72]	0.01	1.6	0.139
Fluorobutadiene	[174]	0.38	1.71	0.713
Methyl methacrylate	[265]	0.3	0.5	0.270
Styrene	[281]	0.15	1.0	0.048
	[289]	0.297	0.788	0.561
	[171]	0.3	1.3	0.14
p-Chlorostyrene	[218]	0.25	1.48	0.209
Methyl methacrylate	[222]	0.85	0.35	0.800
Styrene	[222]	0.85	0.45	0.500
p-Chlorostyrene	[222]	1.3	0.25	1.646
Methyl methacrylate	[7]	0.35	4.0	0.298
Styrene	[7]	0.10	1.31	0.066

(con

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r ₂	r ₁	r ₂	r ₁
e, 2,4,6-trimethyl-	Acrylonitrile	[58]	0.16	0.98	0.064			
	Methyl methacrylate	[58]	0.05	1.6	0.012			
imide, N-vinyl-	p-Chlorostyrene	[58]	0.08	1.4	0.083			
	Methyl acrylate	[80]	0.06	10.	0.342			
	Acrylonitrile	[80]	0.4	1.2	0.897			
	N-Vinyl carbazole	[284]	1.05	0.3	0.105			
	Vinylidene chloride	[104]	0.32	1.44	0.311			
	Methyl methacrylate	[104]	0.064	9.5	0.048			
	N-Vinylpyrrolidone	[96]	1.6	0.6	<u>3.67</u>			
	Styrene	[163]	0.07	9.6	0.046			
	Vinyl acetate		[104]	0.07	10.5	0.046		
			[80]	0.09	7.0	0.054		
e, methyl vinyl		[167]	5.1	0.175	4.523			
		[80]			1.999			
		[104]	6.1	0.18	5.714			
		[195]			-0.194			

	Vinyl acetate	[195]			0.546
c acid, butyl-, vinyl	Methyl acrylate	[185]	0.11	5.0	-0.015
er	Vinyl chloride	[185]	0.30	0.35	0.267
	Vinylidene chloride	[185]	0.065	7.5	0.081
	Styrene	[185]	0.13	2.5	0.004
	Vinyl acetate	[185]	0.20	0.04	0.130
de, ethyl vinyl	Acrylonitrile	[286]	0.2	3.	-0.088
	Methyl methacrylate	[286]	0.01	10.	-0.38
	Styrene	[286]	0.02	7.	0.104
enesulfonamide,	Acrylonitrile	[80]			0.044
acetyl-N-vinyl-	Methyl methacrylate	[80]			-1.801
	Styrene	[80]			~
N-ethyl-N'-vinyl-	Methyl methacrylate	[101]	0.015	1.8	-0.008
	Styrene	[101]	0.020	20.0	-0.326
	Vinyl acetate	[101]	0.63	0.45	0.622
yclopentadienyl	Methyl acrylate	[354]	0.194	0.468	0.212
ganese tricarbonyl	N-Vinylpyrrolidone	[308]	0.14	0.094	0.085
	Styrene	[354]	0.098	2.503	0.097
	Vinyl acetate	[354]	2.35	0.061	7.238
ester, acetic acid	Acrylic acid	[37]	0.01	10.	0.023

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E 1 (continued)

Monomer 1	Ref.	Original			Recalculated		
		r ₂	r ₁	r ₂	r ₂	r ₁	r ₂
Ester, acetic acid (continued)	[301]	0.06	3.07	0.018			
	[158]	0.1	9.	0.033			
Methyl acrylate	[25]	0.5	3.	0.401			
	[235]	0.009	3.88	-0.121			
Acrylonitrile	[75]	0.02	6.	-0.065			
	[75]			-0.016			
	[158]	0.061	4.05	0.058			
	[6]	0.07	6.0	0.066			
Divinylaniline	[45]	0.1	2.0	0.053			
	[188]	0.82	1.28	0.818			
Norbornadiene	[247]	0.01	50.	-0.02			
Chlorobutadiene	[91]	0.05	7.0	-0.556			
Methyl vinyl ketone	[246]	0.152	3.02	0.13			
N-Vinylcarbazole	[90]	4.0	0.15	3.940			
Vinylene carbonate	[144]	3.71	0.0579	3.876			
Crotonic acid	[94]	0.33	0.0	0.317			
	[94]			0.31			

Ethylene	[68]	1.14	0.16	3.76	0
	[309]			<u>0.72</u>	0
Vinyl chloride	[42]	1.08	1.07	<u>1.029</u>	0
	[68]	1.14	0.16	<u>1.22</u>	0
	[158]	0.23	1.68	0.243	1
	[283]	0.28	2.0	0.263	1
	[109]	0.3	1.6	0.434	1
	[86]	0.3	2.45	<u>0.26</u>	2
	[3]	0.3	2.1	0.247	1
Chlorotrifluoroethyl- ene	[148]	0.6	1.8	0.983	1
	[236]	0.6	0.01	0.474	-0
Vinylidene chloride	[59]	0.0	3.6	-0.003	3
	[3]	0.1	6.0	0.031	4
Trichloroethylene	[9]	0.67	0.0	0.698	-0
	[158]	0.66	0.01	0.607	-0
Tetrachloroethylene	[3]	5.	0.0	4.436	-0
	[59]	6.8	0.0	21.16	5
Butyl methacrylate	[165]	0.023	28.8	-0.001	30
Ethyl methacrylate	[210]	-	142.	-0.767	13
Isobutyl methacrylate	[165]	0.025	29.8	0.057	34

(cont)

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r ₂	r ₂	r ₁	r ₂
Ester, acetic acid (continued)	Methyl methacrylate	[210]	-	181.	-0.811	1		
		[158]	0.015	20.	-0.191	1		
	Allyl chloride	[3]	0.7	0.67	0.667	1		
	Isobutylene	[211]	2.15	0.31	1.664	1		
	N-Vinylloxazolidone	[36]	0.52	1.90	0.558	1		
		[102]	0.60	1.50	0.603	1		
	2-Vinylpyridine	[6]	-0.12	12.8	-0.108	1		
	N-Vinylpyrrolidone	[121]	0.237	2.28	0.190	1		
		[36]	0.205	3.30	0.192	1		
		[103]	0.38	0.44	0.257	1		
	Styrene	[158]	0.01	55.	0.020	1		
		[241]	0.0	16.	0.014	1		
	N-Vinylsuccinimide	[80]			0.229	1		
		[167]	0.175	5.1	0.184	1		
	Vinyl Benzoate	[26]	0.7	1.5	0.787	1		
	Vinyl formate	[272]	0.94	0.95	0.942	1		
	Vinyl 12-ketostearate	[146]	1.07	0.08	0.182	1		

	Vinyl stearate	[1]	0.97	1.00	0.954
	Ethyl vinyl ether	[158]	3.0	0.0	3.421
ester, benzoic acid	Acrylonitrile	[47]	0.05	5.0	0.019
	Vinyl chloride	[283]	0.3	1.8	0.342
	Vinylidene chloride	[47]	0.1	7.0	0.066
	N-Vinylpyrrolidone	[253]	0.44	2.45	0.412
	Styrene	[26]	0.05	38.	0.068
	Vinyl acetate	[26]	1.5	0.7	1.642
		[253]	0.99	0.35	1.073
ester, butanoic acid	Chlorobutadiene	[247]	0.02	90.	~
	N-Vinylcarbazole	[246]	0.059	1.28	0.072
	Vinyl chloride	[283]	0.28	2.0	0.301
ester, chloroacetic acid	Acrylonitrile	[362]	0.001	4.05	-0.007
	Vinyl chloride	[283]	0.4	1.6	0.420
	Styrene	[212]	0.05	1.0	-0.036
	Vinyl acetate	[71]	1.20	0.73	<u>1.36</u>
	Butyl vinyl ether	[212]	1.01	0.46	1.427
	Ethyl vinyl ether	[212]	0.98	0.68	1.903
	Phenyl vinyl ether	[212]	1.0	0.8	0.835
ester, cinnamic acid	Styrene	[200]	0.25	1.25	-0.076

(con

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original		Recalculated	
			r ₂	r ₁	r ₂	r ₁
Ester, dichloroacetic acid	Acrylonitrile	[362]	0.05	7.0	0.044	
	Vinyl chloride	[283]	0.7	1.25	0.893	
Ester, formic acid	Acrylonitrile	[47]	0.04	3.0	0.010	
	Chlorobutadiene	[247]	0.01	30.	-0.05	
Ester, hendecanoic acid	N-Vinylcarbazole	[246]	0.196	4.22	0.19	
	Vinyl acetate	[272]	0.95	0.94	0.977	
	Methyl acrylate	[145]	0.031	3.69	0.039	
	Acrylonitrile	[145]	0.0	1.82	0.115	
	Butadiene	[145]	0.015	37.9	-0.221	
	Vinyl chloride	[145]	0.358	1.06	0.379	
Ester, 12-ketostearic acid	Vinylidene chloride	[145]	0.054	2.58	0.038	
	Styrene	[145]	0.02	29.	-0.173	
	Acrylonitrile	[146]	0.0	3.11	-0.208	
	Vinyl chloride	[146]	0.248	0.963	-0.006	
	Vinylidene chloride	[146]	0.0	4.0	0.241	
	Vinyl acetate	[146]	1.26	1.07	-0.283	
Ester, monoethyl oxalate	Acrylonitrile	[124]	0.2	2.0	0.0001	

	Methyl methacrylate	[124]	0.1	6.0	-0.052
	Styrene	[124]	0.1	8.0	-0.123
	Vinyl acetate	[124]	3.0	0.3	9.940
ester, propanoic acid	Chlorobutadiene	[247]	0.05	70.	~
	N-Vinylcarbazole	[246]	0.076	1.68	0.080
ester, octadecanoic acid	Acrylonitrile	[145]	0.064	4.2	0.076
	Butadiene	[145]	0.034	34.5	0.016
	Vinyl chloride	[145]	0.29	0.745	0.244
	Vinylidene chloride	[145]	0.075	3.80	0.074
	Styrene	[145]	0.01	68.	-0.381
	Vinyl acetate	[1]	1.0	0.97	0.966
ester, thiolacetic acid	N-Vinylcarbazole	[97]	0.5	0.622	0.45
	Vinylene carbonate	[186]	12.9	0.04	13.71
	N-Vinylsuccinimide	[97]	3.1	0.095	2.47
ether, di-	Methyl methacrylate	[45]	0.006	10.0	-0.147
	Styrene	[45]	0.02	40.	-0.093
ether, butyl	Methyl acrylate	[345]	0.0	3.60	0.008
	Acrylonitrile	[345]	~	~	~
		[347]	~	~	~
	Vinyl chloride	[279]	0.024	2.6	0.023
	Vinylidene chloride	[279]	0.012	1.73	0.004

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original			Recalculated		
			r ₂	r ₁	r	r ₂	r	r
ether, butyl (continued)	Methyl methacrylate	[127]	0.2	1.6		-0.073		
	N-Vinylpyrrolidone	[215]	0.0	2.97		-0.035		
	Styrene	[241]	0.0	15.		-0.075		
	N-Vinylsuccinimide	[80]	0.0	15.		~		
ether, 2-chloroethyl	Vinyl acetate	[345]	0.0	3.70		<u>0.014</u>		
	Acrylonitrile	[116]	-0.07	1.0		-0.021		
	Vinyl chloride	[304]	0.0	2.59		-0.066		
	Acrylonitrile	[194]	0.03	0.7		<u>0.065</u>		
ether, ethyl	Styrene	[194]	0.0	80.		-0.114	1	
	Vinyl acetate	[158]	0.0	3.0		0.256		
	Methyl acrylate	[347]	0.0	3.65		-0.0005		
	Acrylonitrile	[322]	0.0	1.05		<u>-0.240</u>		
ether, isobutyl		[322]				<u>-0.046</u>		
		[347]	~	~		~		
	Vinyl chloride	[47]	0.02	2.0		0.044		
	Trichloroethylene	[332]	0.045	0.0		0.05		
Styrene		[349]	0.46	9.		<u>0.65</u>		
		[349]	0.20	11.		<u>0.29</u>		

ether, phenyl	Vinyl chloride	[280]	0.161	1.059	0.170
		[172]	0.43	1.93	0.082
	Vinylidene chloride	[280]	0.041	1.634	0.042
		[240]	0.38	2.37	0.431
	Methyl methacrylate	[172]	0.13	140.	0.012
	N-Vinylpyrrolidone	[214]	0.22	4.43	0.240
ether, 1-phenyl-, methyl	Methyl acrylate	[142]	0.0	0.17	0.003
	Acrylonitrile	[142]	0.0	0.06	-0.002
	Methacrylonitrile	[143]	0.0	0.55	-0.02
	Methyl methacrylate	[142]	0.0	2.5	-0.02
	Styrene	[142]	0.0	2.7	0.07
	Acrylonitrile	[303]	0.01	0.13	-0.0004
sulfide, tert-butyl	Styrene	[303]	0.2	4.7	0.16
sulfide, ethyl	Acrylonitrile	[285]	0.055	0.065	0.06
		[336]	0.055	0.065	0.05
	Methyl methacrylate	[303]	0.07	0.93	0.036
	Styrene	[303]	0.12	4.4	0.112
	Ethyl acrylate	[285]	0.05	0.35	0.05
	Methyl acrylate	[285]	0.05	0.35	0.05
	Acrylonitrile	[303]	0.05	0.068	0.022
		[285]	0.05	0.068	0.03

E 1 (continued)

Monomer 2	Monomer 1	Ref.	Original		Recalculated	
			r ₂	r ₁	r ₂	r ₁
sulfide, isobutyl (continued)	Methyl methacrylate	[303]	0.04	0.94	0.021	0.021
		[285]	0.04	0.94	0.04	0.04
	Styrene	[303]	0.1	4.0	-0.106	-0.106
sulfide, methyl	Methyl acrylate	[195]	0.05	0.35	0.086	0.086
	Vinylene carbonate	[120]	10.6	0.05	7.763	7.763
	Styrene	[195]	0.12	5.1	0.066	0.066
sulfide, phenyl		[303]	0.15	5.	0.047	0.047
	Methyl acrylate	[193]	0.05	0.40	-0.018	-0.018
	Acrylonitrile	[285]	0.07	0.11	<u>0.03</u>	<u>0.03</u>
	Styrene	[193]	0.15	4.5	0.019	0.019
		[239]	0.36	3.88	<u>0.26</u>	<u>0.26</u>
	[239]			<u>0.06</u>	<u>0.06</u>	

symbols: underline (—), no conversion data available; (~) nonlinear relationship; (?) scattered

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