Oxidation-Reduction Potentials, Absorbance Bands and Molar Absorbance of Compounds Used in Biochemical Studies

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In addition to the references (*1*, *2*, *3*, *4*, *5*, *7*, and *8*) in the table, other generally useful sources of oxidation-reduction data are: *Biochemist's Handbook*, D. Van Nostrand Co., Princeton, N.J. (1961); *The Encyclopedia of Electrochemistry*, Ed. C. A. Hampel, Reinhold Publishing Corp. N.Y. (1964); *Oxidation-Reduction Potentials in Bacteriology and Biochemistry*, L. F. Hewitt, McCorquodale and Co. Ltd., London sixth ed (1950); *Biochemisches Taschenbuch*, Springer-Verlag, N.Y., part II (1964).

The oxidation-reduction couples are listed according to decreasing values of E° or E°′. When both values are available, the order is according to E°′. Each couple is also numbered so that a particular one might be found more rapidly by consulting the index. Unless otherwise indicated, E°′ is the mid-point potential for a particular couple at pH 7. Temperatures are not listed; most of the data is relevant to room temperature (20°C to 30°C). When more exact conditions are desired (ionic strength, concentration, temperature, nature of data used to derive E° or E°′) the reader should consult the reference listed.

OXIDATION-REDUCTION POTENTIALS, ABSORBANCE BANDS AND MOLAR ABSORBANCE OF COMPOUNDS USED IN BIOCHEMICAL STUDIES

System	E°	E°′	λ_{max}	E_{mM}	Reference
1. F_2(gas)/F^-	2.87	—	—	—	*1*
2. $H_2N_2O_2/N_2$ (gas)	2.65	—	—	—	*1*
3. $S_2O_8^{2-}/SO_4^{2-}$	2.0	—	—	—	*1*
4. H_2O_2/H_2O	1.77	—	—	—	*1*
5. MnO_4^-/MnO_2	1.69	—	—	—	*1*
6. $HClO_2/HClO$	1.64	—	—	—	*1*
7. H_5IO_6/IO_3^-	1.6	—	—	—	*1*
8. MnO_4^-/Mn^{2+}	1.51	—	—	—	*1*
9. Mn^{3+}/Mn^{2+}	1.4	—	—	—	*2*
10. Cl_2(gas)/Cl^-	1.359	—	—	—	*1*
11. ClO_2(gas)/$HClO_2$	1.27	—	—	—	*1*
12. MnO_2/Mn^{2+}	1.23	—	—	—	*1*
13. $[Mn^{3+}(PO_4)_2]^{3-}/[Mn^{2+}(PO_4)_2]^{4-}$	1.22	—	—	—	*2*
14. Pt^{2+}/Pt	1.2	—	—	—	*1*
15. IO_3^-/I_2	1.19	—	—	—	*1*
16. ClO_4^-/ClO_3^-	1.19	—	—	—	*1*
17. ClO_3^-/ClO_2(gas)	1.15	—	—	—	*1*
18. $[Cu^{3+}(IO_6)_2]^{7-}/[Cu^{2+}(IO_6)_2]^{8-}$, pH 8 pH 12	1.1	— 0.7	—	—	*2*
19. Br_2/Br^-	1.087	—	—	—	*1*
20. N_2O_4(gas)/HNO_2	1.07	—	—	—	*1*
21. Fe^{3+}/Fe^{2+}O-phenanthroline	1.06	—	—	—	*3*
22. $[IrCl_6]^{2-}/[IrCl_6]^{3-}$	1.05	—	—	—	*1*
23. VO_3^-/VO^{2+}	1.0	—	—	—	*2*
24. IO_4^-/IO_3^-	1.375	0.96	—	—	*2*
25. HNO_2/NO(gas)	0.99	—	—	—	*1*
26. p-toluene-sulphochloramide, Na salt (Chloramine-T)	1.52	0.90	—	—	*2*
27. Nitrosoguanidine/Nitroguanidine	0.85	—	—	—	*4*
28. O_2/H_2O	1.229	0.816	—	—	*1*
29. NO_3^-/N_2O_4(gas)	0.80	—	—	—	*1*
30. Ag^+/Ag	0.7994	—	—	—	*1*
31. 1,2-Benzoquinone	0.792	—	—	—	*5*
32. Hg_2^{2+}/Hg	0.792	—	—	—	*1*
33. Fe^{3+}/Fe^{2+}	0.771	—	—	—	*1*
34. $[Mo^{3+}(CN)_6]^{3-}/[Mo^{2+}(CN)_6]^{4-}$	0.73	—	—	—	*5*
35. Porphyrexide	—	0.725	—	—	*5*
36. Pyrogallol	0.713	—	—	—	*5*
37. NO(gas)/$H_2N_2O_2$	0.71	—	—	—	*1*
38. Hg^{2+}/Hg_2^{2+}	0.92 0.709	—	—	—	*1*
39. 1,4-Benzoquinone	0.69938	—	—	—	*5*
40. 1,2-Naphthoquinone-4-sulfonate	0.628	—	—	—	*5*
41. Mn^{4+}/Mn^{3+} Hematoporphyrin IX, pH 9.9	—	0.626	400 (ox)	70	*6*
42. MnO_4^-/MnO_4^{2-}	0.6	—	—	—	*1*
43. $S_2O_6^{2-}/H_2SO_3$	0.6	—	—	—	*1*
44. $[W(CN)_8]^{3-}/[W(CN)_8]^{4-}$	0.57	—	—	—	*5*
45. Porphyrindin	—	0.565	—	—	*5*
46. NH_2OH/NH_4	—	0.562	—	—	*7*
47. $H_3AsO_4/HAsO_2$	0.56	—	—	—	*1*
48. O-tolidine	—	0.55	—	—	*5*
49. Cu^{2+}/Cu^+ Hemocyanin	—	0.540	350 600	—	*8, 9*
50. I_2/I^-	0.536	—	—	—	*1*
51. Cu^+/Cu	0.521	—	—	—	*1*
52. $S_2O_3^{2-}$/S	0.5	—	—	—	*1*
53. $S_2O_4^{2-}/S_2O_3^{2-}$	—	0.484	—	—	*7*
54. MoO_2^{2+}/MoO^{3+}	0.48	—	—	—	*1*
55. Phenylhydrazine sulfonate	0.437	—	—	—	*5*
56. 2-Methyl-1,4-naphthoquinone (Menadione-Vitamin K_3)	0.422	—	—	—	*5*
57. P_{700}	—	0.43	—	—	*10*
58. $P_{890}(P_{0.44})$	—	0.44	—	—	*11, 12* *13, 14*
59. NO_3^-/NO_2^-	0.94	0.421	—	—	*1, 7*
60. Cr^{3+}/Cr^{2+}	0.40	—	—	—	*1*

Oxidation-Reduction Potentials, Absorbance Bands and Molar Absorbance of Compounds Used in Biochemical Studies—(Continued)

System	E°	E°′	λ_{max}	E_{mM}	Reference
61. $H_2SO_3/S_2O_3^{2-}$	0.40	—	—	—	*1*
62. Mn^{3+}/Mn^{2+} Mesoporphyrin (pyridine)$_2$	—	0.387	—	—	*8*
63. 2,5-dihydroxy-1,4-benzoquinone	—	0.38	—	—	*5*
64. Adrenalin	0.809	0.380	—	—	*4, 5*
65. p-Amino-dimethyl aniline	—	0.38	—	—	*5*
66. Fe^{3+}/Fe^{2+} Cytochrome f	—	0.365	413 (ox) 423(red) 525(red) 555(red)	—	*66*
67. $[Fe(CN)_6]^{3-}/[Fe(CN)_6]^{4-}$	—	0.36	— 420(ox)	— 1.000	*5* *15*
68. o-Quinone/Diphenol	—	0.35	—	—	*5*
69. Fe^{3+}/Fe^{2+} Cytochrome c_{550} (*R. rubrum*)	—	0.338	409(ox) 416(red) 521(red) 550(red)	—	*16*
70. Cu^{2+}/Cu	0.337	—	—	—	*1*
71. Fe^{3+}/Fe^{2+} acetate, pH 5	—	0.34	—	—	*5*
72. Fe^{3+}/Fe^{2+} Cytochrome c_5 (*Azotobacter*)	—	0.32	420(red) 526(red) 555(red)	—	*17*
73. $As5^{+}/As^{3+}$	—	0.316	—	—	*2*
74. p-Aminophenol	0.779	0.314	—	—	*5*
75. O_2(gas)/H_2O_2	0.69	0.295	—	—	*7*
76. Fe^{3+}/Fe^{2+} Cyt. c_4 (*Azotobacter*)	—	0.30	411(ox) 416(red) 522(red) 551(red)	115.8 157.2 17.6 23.8	*17*
77. Fe^{3+}/Fe^{2+} Cyt c_{552} (*Pseudomonas*)	—	0.300	409(ox) 416(red) 520(red) 552(red)	—	*36*
78. 1,4-Benzoquinone	—	0.293	—	—	*5*
79. Fe^{3+}/Fe^{2+} Cyt a	—	0.29	—	—	*18*
80. p-Quinone/Hydroquinone	—	0.28	—	—	*5*
81. 2,6-dibromo-2′-SO_3H indophenol	—	0.273	—	—	*5*
82. Co^{3+}/Co^{2+} Mesoporphyrin(pyridine)$_2$	—	0.265	—	—	*8*
83. Fe^{3+}/Fe^{2+} Malonate, pH 4	—	0.26	—	—	*5*
84. 2,5-Dihydroxyphenylacetic acid (Homogentisic acid)	0.687	0.260	—	—	*5*
85. Fe^{3+}/Fe^{2+} Salicylate, pH 4	—	0.26	—	—	*5*
86. Fe^{3+}/Fe^{2+} Cyt c	—	0.254	407(ox) 415(red) 521(red) 550(red)	— 125 15.9 27.7	*19, 20*
87. 2,6,2′-Trichloroindophenol	—	0.254	—	—	*5*
88. Fe^{3+}/Fe^{2+} Coproporphyrin $(CN^{-})_2$, pH 9.6	—	0.247	—	—	*8*
89. Fe^{3+}/Fe^{2+} Chlorocruorin(pyridine)$_2$	—	0.246	434(red) 544(red) 562(red)	—	*29*
90. Indophenol	—	0.228	—	—	*5*
91. o-Toluidine Blue	0.677	0.224	—	—	*5*
92. Phenol Blue	—	0.224	—	—	*5*
93. Fe^{3+}/Fe^{2+} Cyt c_1	—	0.22	410(ox) 418(red) 524(red) 554(red)	 116 11.6 24.1	*37*
94. Fe^{3+}/Fe^{2+} Mesoporphyrin poly D,L-(lysine-phenylalanine), pH 4	—	0.22	—	—	*21*
95. Fe^{3+}/Fe^{2+} Cyt b_2 (yeast)	—	0.219	—	—	*22*
96. 2,6-Dichlorophenolindophenol (DCPIP)	—	0.217	600	20.6	*5, 23*
97. 2,6-Dibromoindophenol	—	0.216	—	—	*5*
98. Janus Green	—	0.21	—	—	*5*
99. 3-amino thiazine	—	0.208	—	—	*5*

Oxidation-Reduction Potentials, Absorbance Bands and Molar Absorbance of Compounds Used in Biochemical Studies—(Continued)

System	E°	E°′	λ_{max}	E_{mM}	Reference
100. Butyryl-Co A dehydrogenase $FAD^+/FADH_2$ (Cu present)	—	0.187	—	—	*24*
101. Fe^{3+}/Fe^{2+} $PPIX(CN^-)_2$, pH 9.9	—	0.183	—	—	*8*
102. Fe^{3+}/Fe^{2+} Hemoglobin (H 6.0),	—	0.17	500(ox)	9.0	*25, 26*
			630(ox)	4.0	*27*
pH 7.0	—	0.144	—	—	*26, 28*
103. SO_4^{2-}/H_2SO_3	0.17	—	—	—	*1*
104. 2,6-Dibromo-2′-methoxy-indophenol	—	0.161	—	—	*5*
105. Sn^{4+}/Sn^{2+}	—	0.15	—	—	*2*
106. Adrenodoxin	—	0.15	414(ox)	5.7	*9*
107. 2,6-Dimethylindophenol	—	0.148	—	—	*5*
108. 1,2-Naphthoquinone	0.547	0.143	—	—	*4*
109. Fe^{3+}/Fe^{2+} $PPIX(histidine)_2$, pH 9.5	—	0.138	—	—	*8*
110. Fe^{3+}/Fe^{2+} $PPIX(pyridine)_2$,	—	0.137	419(red)	192	*29*
			525(red)	17.5	*30*
			557(red)	34.4	
pH 9.5	—	−0.017	—	—	*8*
111. 1-Napthol-2-sulfonate indophenol	—	0.123	—	—	*5*
112. Fe^{3+}/Fe^{2+} Cyt_{553} (*R. spheroides*)	—	0.120	412(ox)	—	*31*
			418(red)		
			523(red)		
			553(red)		
113. Toluylene blue	—	0.115	—	—	*5*
114. Fe^{3+}/Fe^{2+} Cyt_{552} (*Chromatium*)	—	0.100	410(ox)	—	*16*
			417(red)		
			525(red)		
			552(red)		
115. Ubiquinone/Ubihydroquinone (in 95% ethanol)	0.542	0.10	275	15	*32*
116. TiO^{2+}/Ti^{3+}	—	0.10	—	—	*3*
117. $S_4O_6^{2-}/S_2O_3^{2-}$	0.08	—	—	—	*1*
118. Dehydroascorbic acid/ascorbic acid,	—	0.058	—	—	*5*
pH 4	—	0.166	—	—	*7*
pH 8.7	—	−0.012	—	—	*2*
119. N-methylphenazinium methosulfate (PMS)	—	0.08	387(ox)	23.8	*33*
			388(semi-450quinone)		*5*
120. Fe^{3+}/Fe^{2+} Cyt b (mitochondrial)	—	0.077	—	—	*34*
		0.050	429	114	
			532		
			561	21	
		−0.040			*18*
121. $[W^{5+}(OH^-)_4(CN^-)_4]^{3-}/[W^{4+}/OH^-)_4(CN^-)_4]^{4-}$	—	0.07	—	—	*35*
122. Thionine	0.563	0.064	—	—	*5*
123. Thioindigo-tetrasulfonate	0.409	0.063	—	—	*5*
124. Fe^{3+}/Fe^{2+} $Mesoporphyrin(Pyridine)_2$	—	0.063	—	—	*8*
125. Phenazine ethosulphate	—	0.055	—	—	*5*
126. Cresyl Blue	0.583	0.047	632	—	*5*
127. Fe^{3+}/Fe^{2+} Myoglobin	—	0.046	500(ox)	9.1	*28, 27*
			630(ox)	3.5	
128. Fe^{3+}/Fe^{2+} Cyt b_3 (plants)	—	0.040	560(red)	—	*39*
			529(red)		
129. 1,4-Naphthoquinone	0.470	0.036	—	—	*5*
130. Toluidine blue	0.534	0.034	—	—	*5*
131. Fumaric/Succinate	—	0.031	—	—	*7*
132. $[Ni(C_{10}H_{10})]^+/Ni(C_{10}H_{10})$	—	0.03	—	—	*40*
133. Thiazine blue	—	0.027	—	—	*5*
134. Gallocyanine	—	0.021	—	—	*5*
135. Fe^{3+}/Fe^{2+} Cyt b_5 (microsomal)	—	0.02	413(ox)	117	*41*
			423(red)	170	
			526(red)	13	
			555(red)	26	
136. Thioindigo disulfonate	0.347	0.014	—	—	*5*
137. Methylene blue	0.532	0.011	688(ox)	—	*5*

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System	E°	E°′	λ_{max}	E_{mM}	Reference
138. Fe^{3+}/Fe^{2+} methylated heme undecapeptide of Cyt c (pyridine)	—	0.008	—	—	*68*
139. Fe^{3+}/Fe^{2+} oxalate	—	0.002	—	—	*5*
140. 3-Methyl-9-phenyl isoalloxazine	—	−0.002	—	—	*5*
141. Fe^{3+}/Fe^{2+} Hematoporphyrin $(pyridine)_2$	—	−0.004	519(red) 545(red)	—	*8, 29*
142. Fe^{3+}/Fe^{2+} Cytochromoid c (*Chromatium*)	—	−0.040	406(ox) 418(red) 525(red) 552(red)	—	*42*
143. Fe^{3+}/Fe^{2+} Cytochromoid c (*R. rubrum*)	—	−0.008	390(ox) 424(red) 568(red)	—	*70*
144. Crotonyl-CoA/Butyryl-CoA	—	−0.015	—	—	*38*
145. Pyocyanine	0.235	−0.034 −0.038	690(ox) 370	4.5	*33* *5*
146. Indigo-tetrasulfonate	0.365	−0.046	—	—	*5*
147. 2-Methyl-3-phytyl-1,4-naphthoquinone (Vitamin K_1/Dihydro-Vitamin K_1)	0.363	−0.05	—	—	*5*
148. Luciferin	—	−0.05	— 490(ox) 380(ox)	— 8.85 10.8	*4*
149. Fe^{3+}/Fe^{2+} Rubredoxin		−0.057	333(ox) 311(red)	6.3 10.8	*69*
150. Fe^{3+}/Fe^{2+} Cyt b_6 (Chloroplasts)	—	−0.06	563(red)	—	*43*
151. Methyl Capri Blue	0.477	−0.061	—	—	*5*
152. $H_2SO_3/HS_2O_4^-$	−0.08	—	—	—	*1*
153. Fe^{3+}/Fe^{2+} mesoporphyrin poly-D,L-(glu-phe), pH 9	—	−0.07	—	—	*21*
154. Xanthine oxidase	—	−0.08	—	—	*5*
155. Indigo-trisulfonate	0.332	−0.081	—	—	*5*
156. Fe^{3+}/Fe^{2+} 1, 3, 5, 8-tetramethyl porphyrin-6,7-dipropionic acid methyl ester-2,4-disulfonic acid	—	−0.09	—	—	*44*
157. Thiohistidine	—	−0.09	—	—	*4*
158. $[V(C_{10}H_{10})]^{2+}/[V(C_{10}H_{10})]^{+}$	—	−0.08	—	—	*40*
159. Glyoxylate/Glycollate	—	−0.090	—	—	*7*
160. Fe^{3+}/Fe^{2+} heme undecapeptide from cyt c (pyridine)	—	−0.092	403(ox) 413(red) 521(red) 551(red)	117 155	*68*
161. 6,8,9-trimethyl isoalloxazine	—	−0.109	—	—	*5*
162. Chloraphine	0.274	−0.115	—	—	*5*
163. CO_2(gas)/CO(gas)	−0.12	—	—	—	*1*
164. Yellow enzyme FMN/$FMNH_2$	—	−0.122	—	—	*45*
165. Indigo-disulfonate	0.291	−0.125	—	—	*5*
166. 9-phenyl isoalloxazine	—	−0.126	—	—	*4*
167. Vitamin K reductase	—	−0.127	—	—	*46*
168. 2-OH-1,4-Napthoquinone	—	−0.139	—	—	*5*
169. Thioglycolic acid	—	−0.14	—	—	*4*
170. Fe^{3+}/Fe^{2+} (Pyrophosphate)	—	−0.14	—	—	*5*
171. 2-Amino-N-Methyl Phenazine Methosulfate	—	−0.145	—	—	*5*
172. Indigo-monosulfonate	0.262	−0.157	—	—	*5*
173. Hydroxypyruvate/Glycerate	—	−0.158	—	—	*7*
174. Oxaloacetate/Malate	—	−0.166	—	—	*47*
175. Brilliant Alizarin Blue	—	−0.173	—	—	*5*
176. Alloxazine	—	−0.170	—	—	*5*

Oxidation-Reduction Potentials, Absorbance Bands and Molar Absorbance of Compounds Used in Biochemical Studies—(Continued)

System	E°	E°′	λ_{max}	E_{mM}	Reference
177. Mn^{3+}/Mn^{2+} Methyl pheophorbide *a*	—	−0.180	370(ox)	39	*48*
			425(ox)	31	
			475(ox)	13	
			665(ox)	17	
			418(red)	120	
			647(red)	24	
178. 2-Methyl-3-hydroxy-1,4-Naphthoquinone	—	−0.180	—	—	*5*
(Phthiocol)	—		—	—	*4*
179. 9-Methyl-isoalloxazine	—	−0.183	—	—	
180. Anthraquinone-2,6-disulfonate	0.228	−0.184			*5*
181. Pyruvate/Lactate	—	−0.185	—	—	*4*
		−0.190			*7*
182. Fe^{3+}/Fe^{2+} Protoporphyrin IX (borate buffer), pH 8.2	—	−0.188	—	—	*4, 49*
183. Neutral Blue	0.17	−0.19	—	—	*5*
184. Dihydroxy acetone-P/	—	−0.19	—	—	*4*
α-Glycero-P		−0.192			*7*
185. Acetaldehyde/Ethanol	—	−0.197	—	—	*4, 7*
186. $[Ti(C_{10}H_{10})]^{2+}/[Ti(C_{10}H_{10})]^{+}$	—	−0.20	—	—	*40*
187. $SO_4^{2-}/S_2O_6^{2-}$	−0.2	—	—	—	*1*
188. Fe^{3+}/Fe^{2+} heme undecapeptide, Cyt c (imidazole)	—	−0.201	—	—	*68*
189. Riboflavin	—	−0.208	260	27.7	*4,*
			375(ox)	10.6	
			450(ox)	12.2	*50*
190. Fe^{3+}/Fe^{2+} Cyt c_3 (*Desulforibro desulfuricans*)	—	−0.205	410(ox)	—	*51*
			419(red)		
			525(red)		
			553(red)	4.2	
191. Fe^{3+}/Fe^{2+} heme octapeptide from	—	−0.205	397(ox)	140	*52*
Cyt c			414(red)	128	
			520(red)	6	
			550(red)	10	
192. $[Ru(NH_3)_6]^{3+}/[Ru(NH_3)_6]^{2+}$	—	−0.214	—	—	*53*
193. Fe^{3+}/Fe^{2+} heme octapeptide from	—	−0.217	405(ox)	122	*68*
Cyt c (Imidazole)			416(red)	162	
			520(red)		
			550(red)		
194. Anthraquinone-1-sulfonate	0.195	−0.218	—	—	*5*
195. $FMN/FMNH_2$, pH 7.09	—	−0.219	260	27.1	*54*
		−0.211	375(ox)	10.4	*50*
			450(ox)	12.2	
196. $FAD/FADH_2$	—	−0.219	260	37	*54*
			375(ox)	9.3	
			450(ox)	11.3	
197. 6,7,9-trimethyl-isoalloxazine	—	−0.223	—	—	*54*
(Lumiflavin)					
198. Janus Green B	—	−0.225	—	—	*5*
199. Fe^{3+}/Fe^{2+} Protoporphyrin IX	—	−0.226	395(ox)	55	*4,*
(phosphate buffer), pH 8.2			495(ox)	7	*30*
			620(ox)	6	
200. Glutathione	—	−0.23	—	—	*7, 5*
		−0.34			
201. Acetoacetyl CoA/B-OH-Butyryl CoA	—	−0.238	—	—	*7*
202. S(rhombic)/H_2S	0.14	−0.243	—	—	*1, 7*
203. Acetylmethyl carbinol/butane-2,3-diol	—	−0.244	—	—	*7*
204. 3-Acetylpyridine-NAD	—	−0.248	—	—	*55*
205. Phenosafranine	0.280	−0.252	—	—	*5*
206. V^{3+}/V^{2+}	−0.255	—	—	—	*5*
207. Acetoacetate/β-hydroxybutyrate	—	−0.346	—	—	*7*
208. Mn^{3+}/Mn^{2+} HematoporphyrinIX	—	−0.268	—	—	*6*
dimethyl ester					
209. Fe^{3+}/Fe^{2+} Peroxidase (horseradish)	—	−0.271	415(ox)	60	*56, 27, 57*
			500(ox)	10.0	
			640(ox)	3.0	
210. Fructose-sorbitol	—	−0.272	—	—	*5*
211. H_3PO_4/H_3PO_3	−0.276	—	—	—	*1*

Oxidation-Reduction Potentials, Absorbance Bands and Molar Absorbance of Compounds Used in Biochemical Studies—(Continued)

System	E°	E°′	λ_{max}	E_{mM}	Reference
212. Rosindulin 2G	0.139	−0.281	—	—	*5*
213. Thionicotinamide-NAD	—	−0.285	400(red)	—	*58*
214. Acetone/Isoproponol	—	−0.281	—	—	*5*
		−0.286			
215. Safranine T	0.235	−0.289	—	—	*5*
216. Lipoic Acid	—	−0.29	—	—	*5*
217. Indulin Scarlet	0.047	−0.299	—	—	*5*
218. Thiophenol	—	−0.30	—	—	*4*
219. 4-Aminoacridine	—	−0.301	—	—	*59*
220. Acridine	—	−0.313	—	—	*59*
221. NAD^+/NADH	−0.105	−0.320	259(ox)	18	*7, 50*
			259(red)	15	
			339(red)	6.2	
222. $NADP^+$/NADPH	—	−0.324	259(ox)	18	*7, 50*
			259(red)	15	
			339(red)	6.2	
223. Neutral Red	0.240	−0.325	—	—	*5*
224. Cystine/Cysteine	—	−0.340	240(ox) (shoulder)	0.050	*7*
225. Lipoyl dehydrogenase	—	−0.34	—	—	*60*
226. NAD^+/α-NADH	—	−0.341	259(ox)	17	*61*
			346(red)		
227. Mn^{3+}/Mn^{2+} Hematoporphyrin IX	—	−0.342	370(ox)	79	*6*
			460(ox)	50	
			545(ox)	12	
			770(ox)	1.3	
			416(red)	175	
			545(red)	18	
228. Uric aid/Xanthine	—	−0.36	—	—	*7*
229. Benzyl viologen	—	−0.36	—	—	*5*
230. Gluconolactone/Glucose	—	−0.364	—	—	*7*
231. 3-Aminoacridine	—	−0.369	—	—	*59*
232. Xanthine/Hypoxanthine	—	−0.371	248.5(ox)	10.2	*7, 50*
			278 (ox)	8.9	
233. 1-Aminoacridine	—	−0.394	—	—	*59*
234. Cr^{3+}/Cr^{2+}	−0.40	—	—	—	*2*
235. N-methyl nicotinamide	—	−0.419	—	—	*5*
236. CO_2/Formate	−0.20	−0.42	—	—	*1*
237. Fe^{3+}/Fe^{2+} ferredoxin (*Clostridium*)	—	−0.413	300(ox)		*65*
			390(ox)	6	
238. H^+/H_2	0.000	−0.421	—	—	*5*
239. Fe^{3+}/Fe^{2+} ferredoxin (spinach)	—	−0.432	325	—	*65*
			420(ox)		
			463(ox)		
240. Methyl violgoen	—	−0.44	—	—	*5*
241. Xanthine oxidase	—	−0.45	—	—	*63*
242. SO_4^{2-}/SO_3^{2-}	—	−0.454	—	—	*7*
243. Gluconate/Glucose	—	−0.44	—	—	*62*
		−0.47			*7*
244. 2-Aminoacridine	—	−0.486		—	*59*
245. Oxallate/Glyoxalate	—	−0.50	—	—	*7*
246. H_3PO_3/H_3PO_2	−0.50	—	—	—	*1*
247. $SO_3^{2-}/S_2O_4^{2-}$	—	−0.527	—	—	*7*
		−0.471			
248. Acetate/acetaldehyde	—	−0.581	—	—	*7*
		−0.589			
249. 2,8-diaminoacridine	—	−0.731	—	—	*59*
250. SiO_2/Si	−0.86	—	—	—	*1*
251. 5-Aminoacridine	—	−0.916	—	—	*59*
252. N_2(gas)/H_3NOH^+	−1.87	—	—	—	*1*
253. Formamidine sulfinic acid	—	−1.5	—	—	*64*

Compiled by Paul A. Loach.

Oxidation-Reduction Potentials, Absorbance Bands and Molar Absorbance of Compounds Used in Biochemical Studies—(Continued)

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