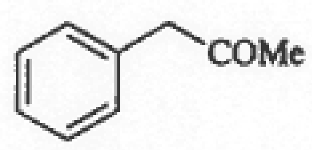
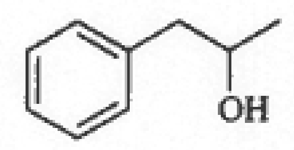
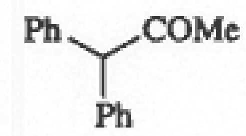
TABLE II. CARBANIONS DERIVED FROM KETONES

A. Enolate from Acetone

Substrate	Nucleophile	Conditions	Product(s) and Yield(s) (%)	Refs.
PhF	$^{-}CH_2COMe$	K, NH_3, –78°	 I (3) +  II (46)	94
		hν, NH_3, 3.3 h	I (60) + C_6H_6 III (31)	136
PhCl		1. K, NH_3, –78° 2. [O]	I (68)	94
		hν, NH_3, 3 h	I (61) + III (31) +  IV (5)	136
PhBr		K, NH_3, –78°	I (67) + II (10) + IV (14)	94
		hν, NH_3, 11 min	I (85) + IV (14)	136
		hν, NH_3:Et_2O 1:1, 0.5 h	I (41) + III (13)	108
		hν, DMSO, 1 h	I (61) + IV (6)	108
PhI		1. K, NH_3, –78° 2. [O]	I (71)	94
		hν, NH_3, 5 min	I (67) + III (20) + IV (10)	136
		hν, DMSO, 1 h	I (88) + IV (4)	138, 340, 41
		DMSO, 1 h	I (50)	62
		$FeCl_2$, DMSO, 10 min	I (60)	75
PhOPh		K, NH_3, –78°	II (5)	94

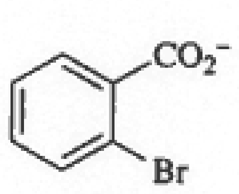
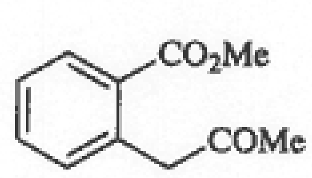
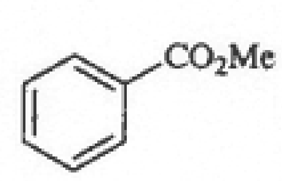
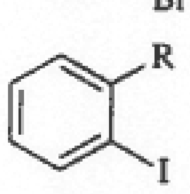
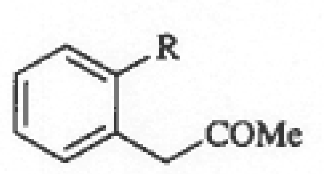
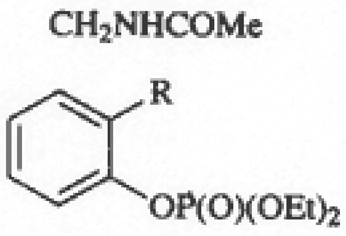
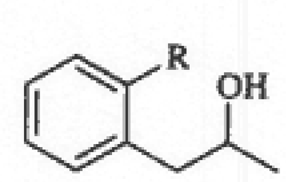
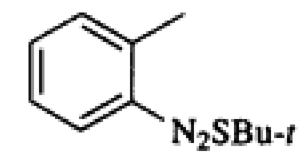
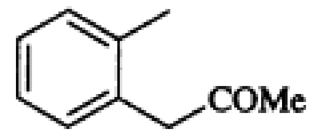
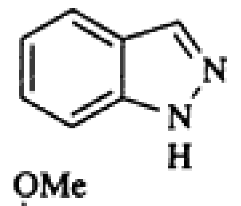
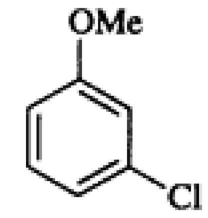
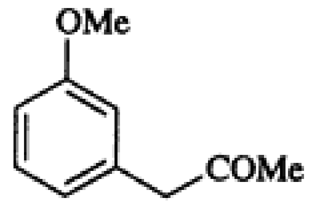
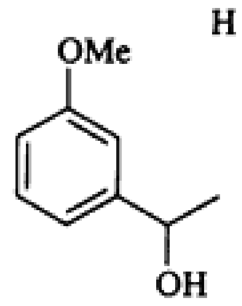
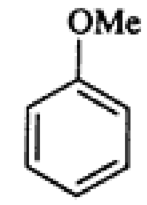
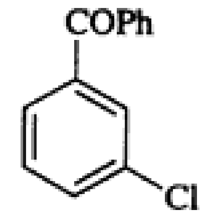
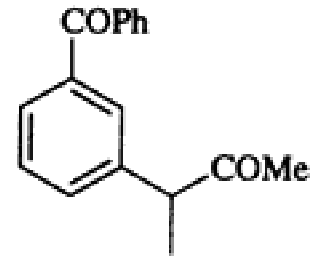
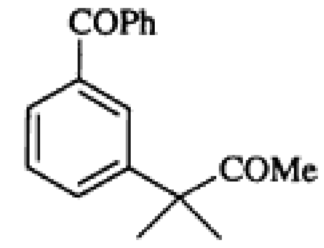
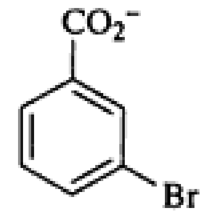
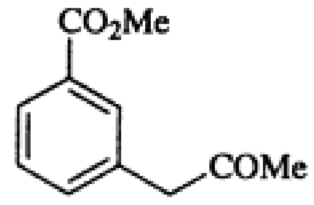
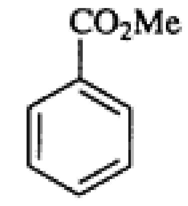
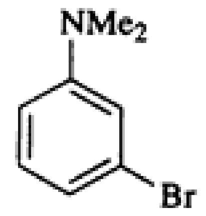
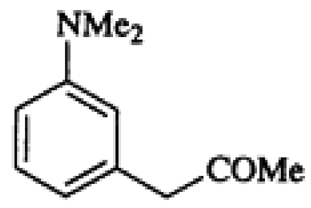
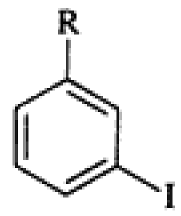
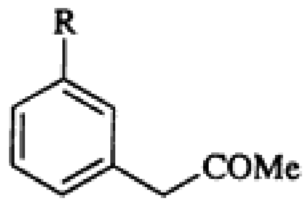
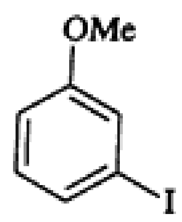
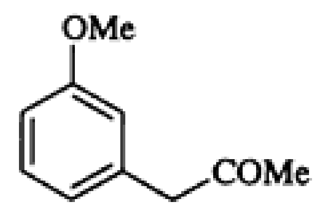
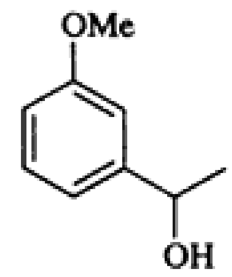
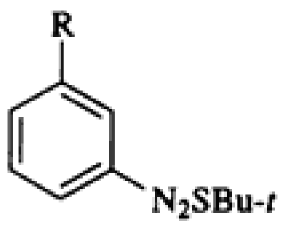
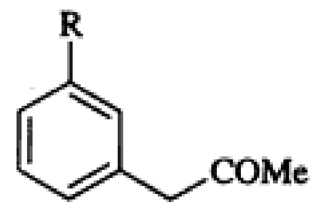
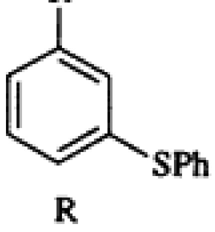
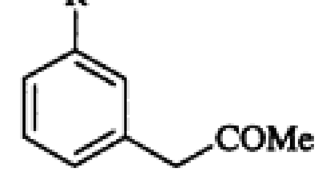
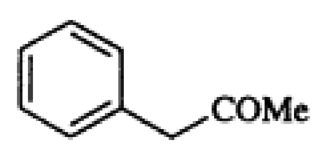
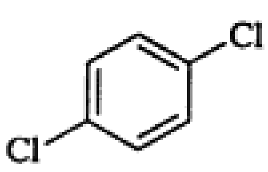
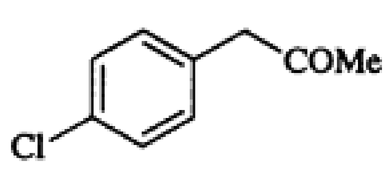
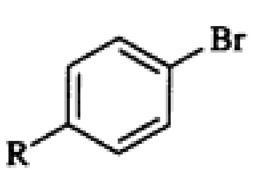
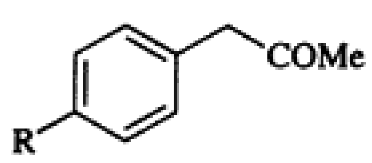
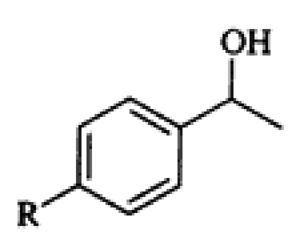
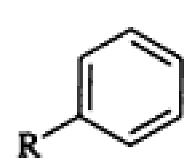
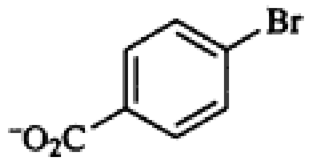
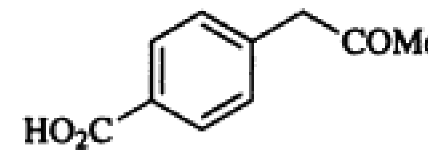
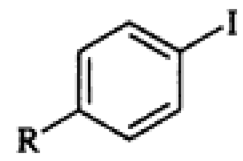
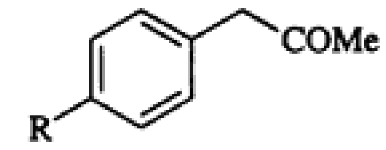
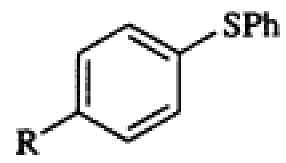
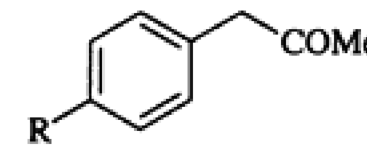
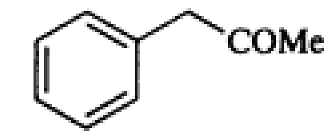
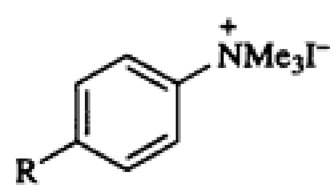
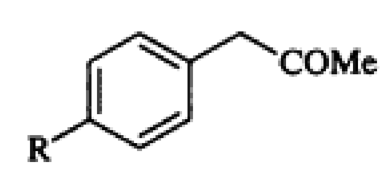
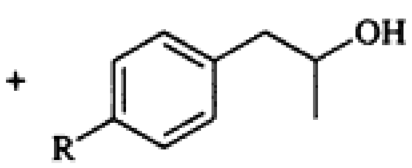
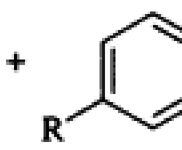
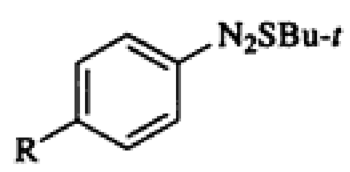
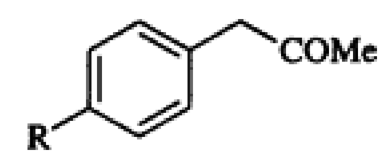
Substrate	Nucleophile	Conditions	Product(s) and Yield(s) (%)	Refs.
		hν, NH_3, 4.2 h	I (14) + PhOH (20)	136
$PhOP(O)(OEt)_2$		K, NH_3	I (5) + II (56) + III (27)	108, 94
		hν, NH_3, 4.2 h	I (13) + III (11) + PhOH (71)	136
PhSPh		K, NH_3, –78°	I (18) + II (71) + PhSH (84)	94
		hν, NH_3, 0.5 h	I (66) + III (26) + IV (5) + PhSH (97)	136
$Ph_3S^+Cl^-$		*hν*, NH_3, 1.2 h	I (75) + PhSH (52) + Ph_2S (22)	136
PhSePh		*hν*, NH_3, 3.3 h	I (95) + PhSeH (83)	136
$Ph\overset{+}{N}Me_3I^-$		K, NH_3	I (46) + II (18) + IV (7)	94
		hν, NH_3, 1 h	I (57) + III (37)	136
PhN_2SBu-*t*		Lab. light, DMSO, 1.7 h	I (75)	58
		1. *hν*, NH_3, 1.5 h 2. CH_2N_2	 (85) +  (10)	168, 108
		*hν*, NH_3	 I + PhR II	
R			I / II	
OMe		5-15 min	(67) / (—)	291
CH_2NHCO_2Et		0.8 h	(58) / (11)	291, 290
$CH_2NHCOMe$		0.7 h	(30) / (28)	291
		K, NH_3	I +  II + PhR III	108
R			I / II / III	
Pr-*i*			(6) / (24) / (54)	
Bu-*t*			(1) / (4) / (73)	

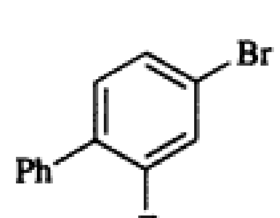
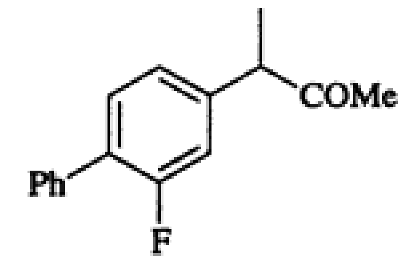
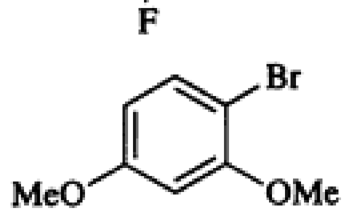
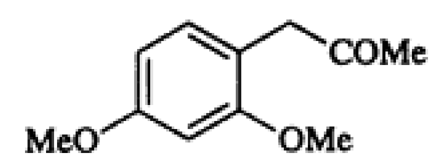
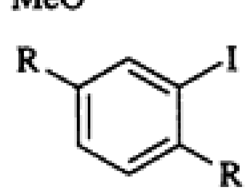
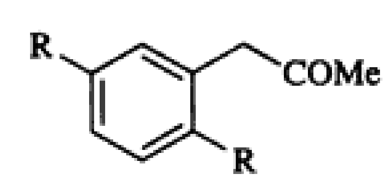
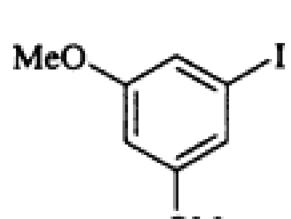
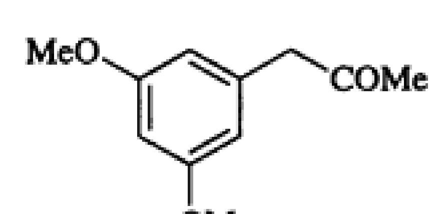
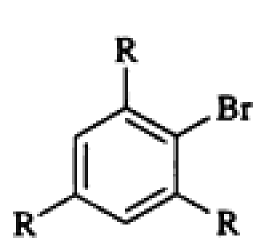
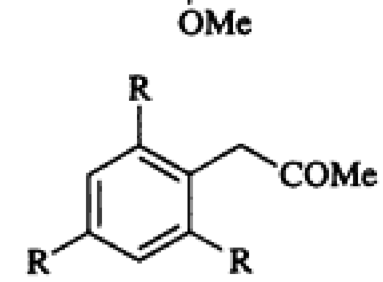
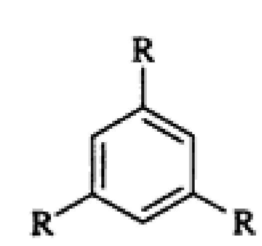
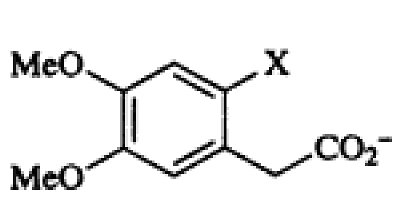
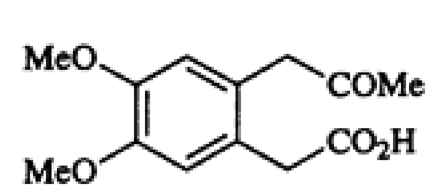
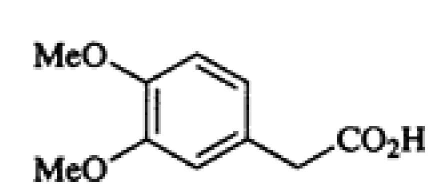
TABLE II. CARBANIONS DERIVED FROM KETONES (*Continued*)

A. Enolate from Acetone (*Continued*)

Substrate	Nucleophile	Conditions	Product(s) and Yield(s) (%)	Refs.
	$^-CH_2COMe$	Lab. light, DMSO, 1.5 h	 (10) +  (70)	58
		K, NH_3	 (6) +  (12) +  (9)	96
		1. *h*ν, NH_3, 2 h 2. MeI	 (12) +  (32)	164
		1. *h*ν, NH_3, 2.3 h 2. CH_2N_2	 (80) +  (8)	108
		*h*ν, NH_3	 (82)	146
		*h*ν, NH_3		
R = F		1.2 h	(56)	108
R = CF_3		1.5 h	(35) + $PhCF_3$ (14)	108
R = NH_2		4 min	(66)	106
		K, NH_3	 (54) +  (8)	96
		Lab. light, DMSO,		58
R = Me		1.5 h	(81)	
R = OMe		1.5 h	(79)	
R = COPh		0.7 h	(44) + PhCOPh (36)	
		*h*ν, NH_3	 I +  II	160
R = Me		1.75 h	I (48); II (39)	
R = OMe		1.25 h	I (49); II (28)	
		e^-, NH_3, –78°, mediator	 (48)	85
			 +  + 	
R = Me		K, NH_3, –78°	(57) + (17) + (26)	94
R = OMe		K, NH_3, –78°	(36) + (10) + (44)	94
R = OMe		Na(Hg), NH_3, mediator	(57) + (—) + (21)	101
R = COPh		Na(Hg), NH_3	(78) + (—) + (—)	101
R = Ph		*h*ν, NH_3, 2.5 h	(69) + (—) + (—)	108
R = NEt_2		*h*ν, NH_3, 1.5 h	(—) + (—) + (8)	108

A. Enolate from Acetone (*Continued*)

Substrate	Nucleophile	Conditions	Product(s) and Yield(s) (%)	Refs.
	$^{-}CH_2COMe$	1. *hν*, NH_3, 1.5 h 2. H_3O^+	 (70)	108
		*hν*, NH_3	 R: NH_2 (33)[a]; NMe_2 (90)	106, 146
		*hν*, NH_3	 + 	160
R = Me		1.75 h	(38) + (28)	
R = OMe		1.5 h	(50) + (16)	
		K, NH_3, −78°	 +  + 	94
R = Me			(30) + (42) + (6)	
R = OMe			(20) + (39) + (40)	
		Lab. light, DMSO,		58
R = Bu-*i*		0.5 h	(42)	
R = Bu-*t*		1.5 h	(86)	
R = OMe		1.5 h	(69)	
R = COPh		0.75 h	(78)	

Substrate	Nucleophile	Conditions	Product(s) and Yield(s) (%)	Refs.
		1. *hν*, NH_3, 2 h 2. MeI	 (62)	164
		*hν*, NH_3, 2 h	 (76)	108
		*hν*, NH_3, 2.2 h	 R: Pr-*i*- (78); Bu-*t* (26)	108
		*hν*, NH_3, 1 h	 (68)	108
		*hν*, NH_3	 + 	108
R = Et		2 h	(70) + (22)	
R = Pr-*i*		2.5 h	(2) + (—)	
		1. *hν*, NH_3 2. H_3O^+	 + 	149
X = Br		3 h	(60) + (40)	
X = I		25 min	(75-80) + (20-25)	

A. Enolate from Acetone (*Continued*)

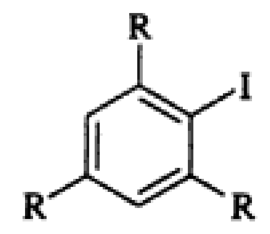
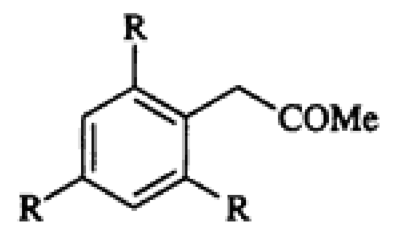
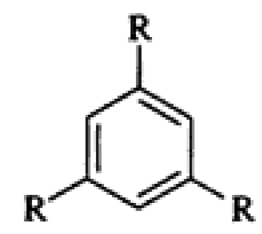
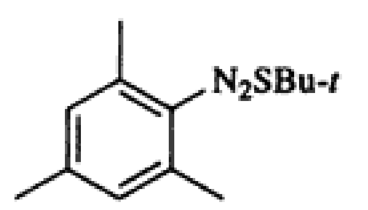
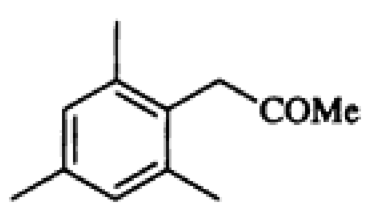
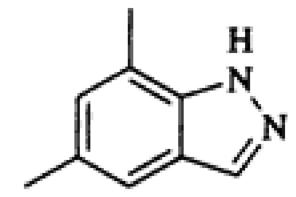
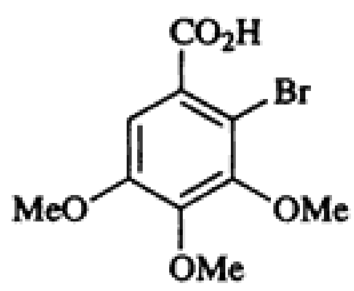
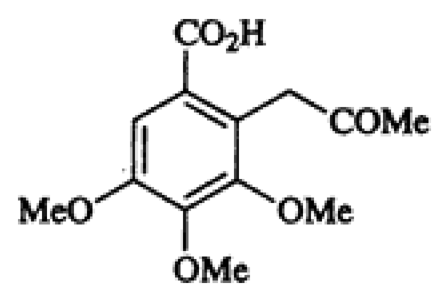
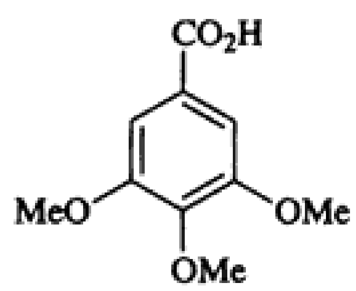
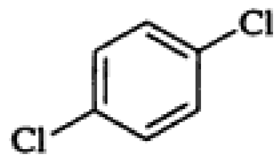
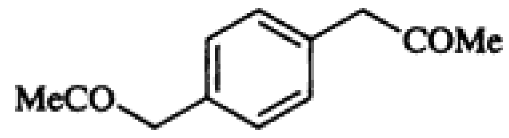
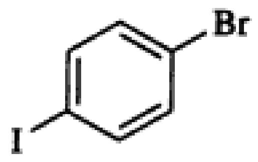
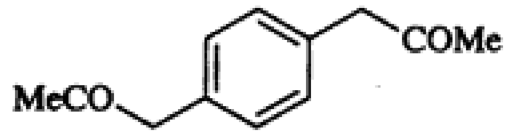
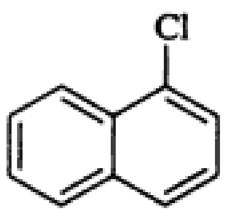
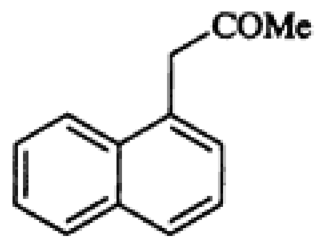
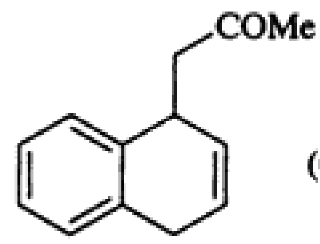
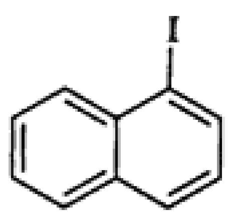
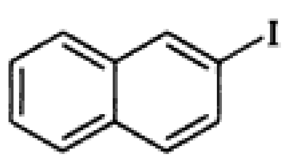
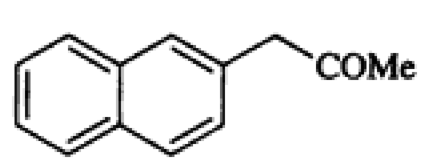
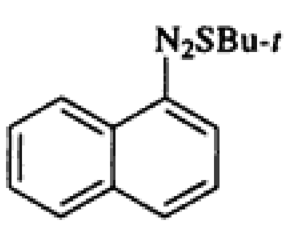
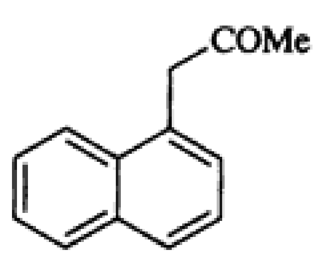
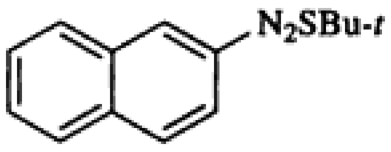
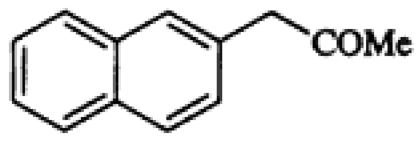
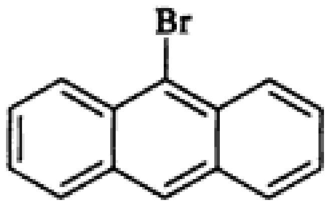
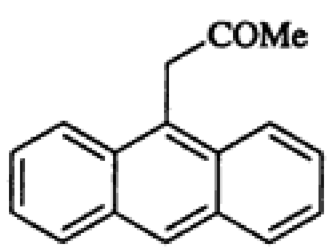
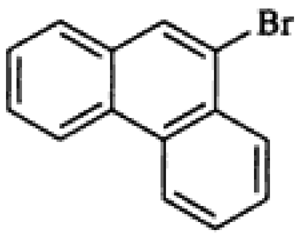
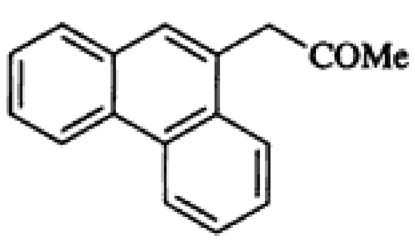
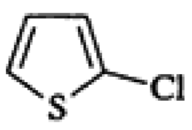
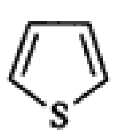
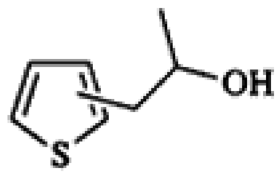
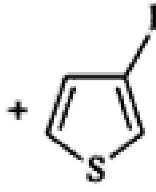
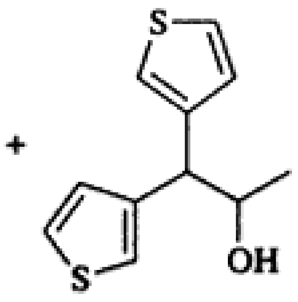
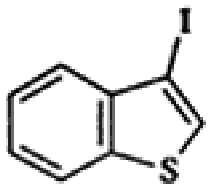
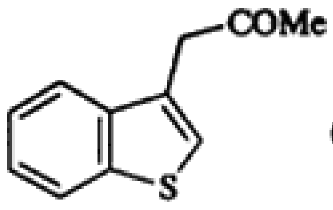
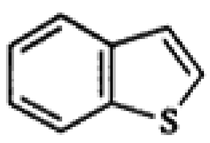
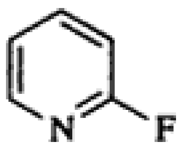
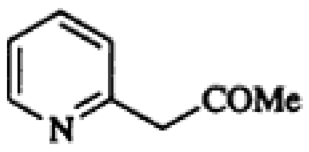
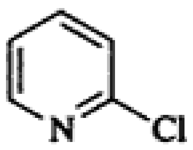
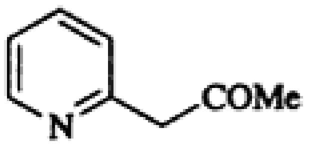
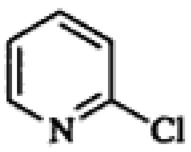
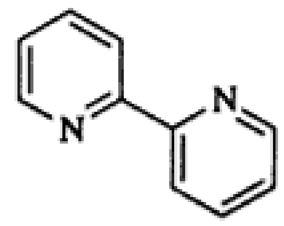
Substrate	Nucleophile	Conditions	Product(s) and Yield(s) (%)	Refs.
	$^{-}CH_2COMe$	hν, NH_3	 + 	108
R				
Me		0.5 h	(82) (10)	
OMe		1.5 h	(92) (—)	
Pr-*i*		3 h	(16) (37)	
		Lab light, DMSO, 2 h	 (30) +  (50)	58
		1. hν, NH_3 2. H_3O^+	 (78) +  (11)	168
		hν, NH_3, 3 h	 (42)	166
		hν, NH_3, 4 h	 (32)	166
		K, NH_3	 I (23) +  (69)[b]	45
		hν, NH_3, 1.5 h	I (88)	45
		Na(Hg), NH_3	I (98)	101
		K, NH_3	I (6) + II (84)[b]	45
		hν, NH_3, 1 h	I (76)	108
		hν, NH_3, 1.5 h	 (75)	108
		Lab light, DMSO, 1 h	 (75)	58
		Lab light, DMSO, 0.5 h	 (76)	58
		hν, NH_3, 1 h	 (98)	108
		hν, NH_3, 1.3 h	 (62)	108
		Na, NH_3, −78°	 I (2) +  (22) +  (46)	152
		hν, NH_3, 1 h	I (17)	152

TABLE II. CARBANIONS DERIVED FROM KETONES (*Continued*)

A. Enolate from Acetone (*Continued*)

Substrate	Nucleophile	Conditions	Product(s) and Yield(s) (%)	Refs.
	$^{-}CH_2COMe$		 I +  II +  III	
		Na, NH_3, –78°	2-Br, I (4) + II + (3) + III (70) +  (10)	152
		*h*ν, NH_3, 1 h	2-Br, I (31)	152
		K, NH_3, –78°	3-Br, I (29) + II (23) + III (29) +  IV (10)	152
		*h*ν, NH_3, 1 h	3-Br, I (51) + IV (25)	152
		DMSO, 1 h	 (12) +  (23)	151
		*h*ν, NH_3, 2 h	 (40)	137
		*h*ν, NH_3, 1 h	 I (85)	137
		Na(Hg), NH_3	I (15) +  (10) +  (55)	101

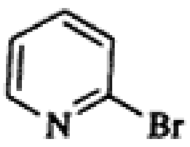
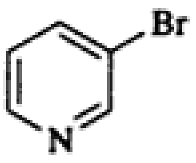
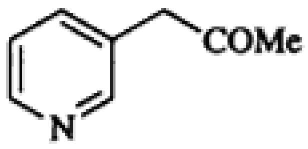
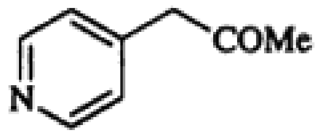
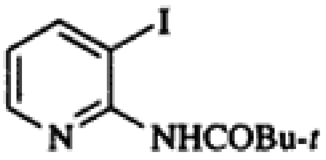
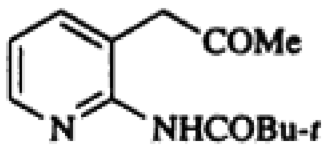
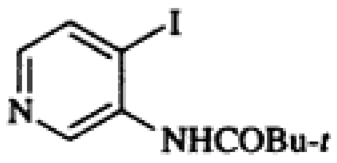
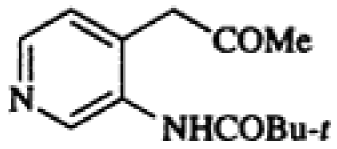
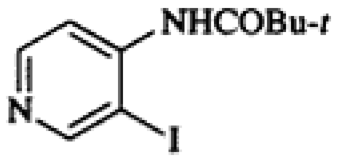
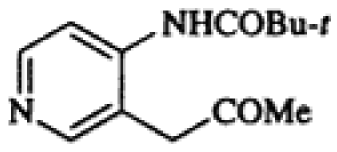
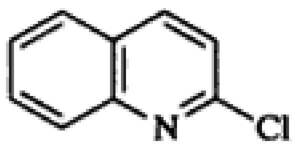
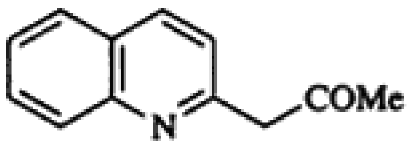
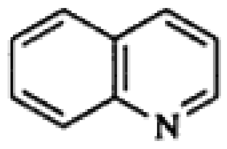
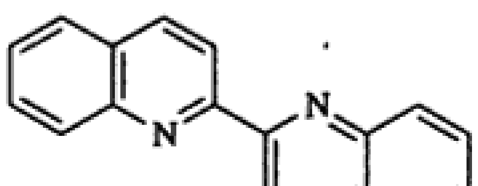
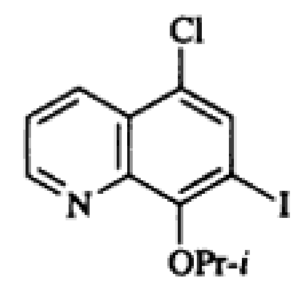
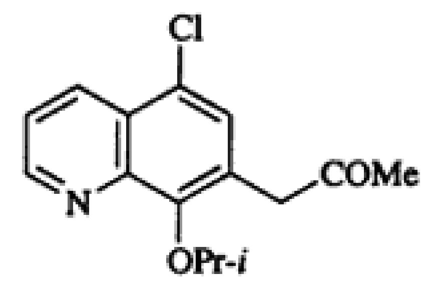
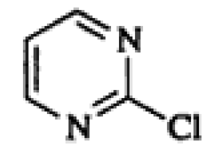
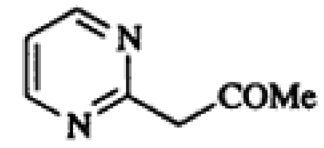
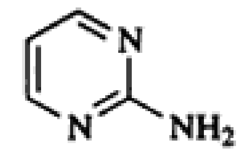
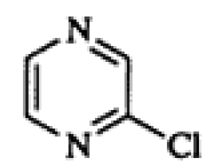
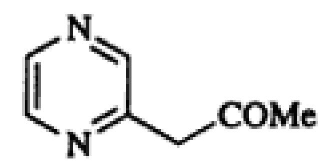
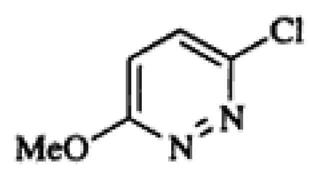
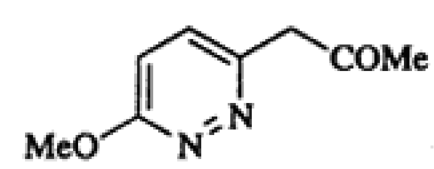
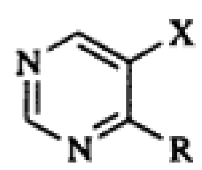
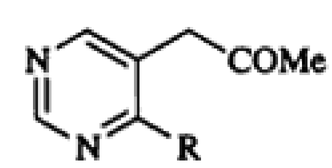
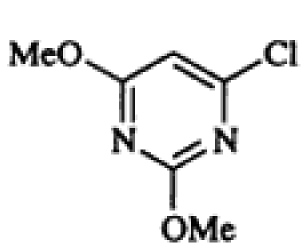
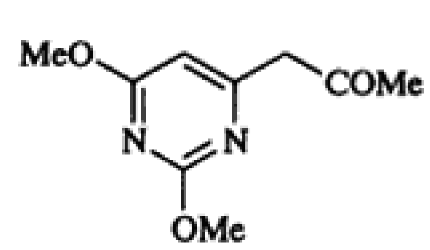
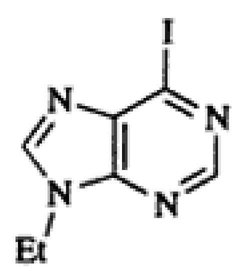
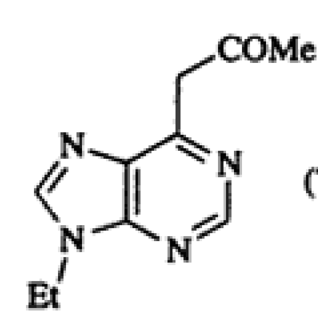
Substrate	Nucleophile	Conditions	Product(s) and Yield(s) (%)	Refs.
		K, NH_3	I (4)	137
		*h*ν, NH_3, 15 min	I (100)	137
		*h*ν, THF, 15 min	I (64)	144
		*h*ν, NH_3, 15 min	 (65)	137
		*h*ν, NH_3, 15 min	 (28)	137
		*h*ν, NH_3	 (90)	139
		*h*ν, NH_3	 (95)	139
		*h*ν, NH_3	 (90)	139
		K, NH_3	 I (43) +  (29)	142
		*h*ν, NH_3,[c] 1 h	I (90)	142
		*h*ν, NH_3,[d] 1 h	I (62)	157
		Na(Hg), NH_3	I (49) +  (50)	101

TABLE II. CARBANIONS DERIVED FROM KETONES (*Continued*)

A. Enolate from Acetone (*Continued*)

Substrate	Nucleophile	Conditions	Product(s) and Yield(s) (%)	Refs.
	$^-CH_2COMe$	$h\nu$, 1 h		144
		THF	I (82)	
		DMF	I (74)	
		DME	I (28)	
		Et_2O	I (9)	
		C_6H_6	I (4)	
		DMSO, 5 min	I (37)	
		$h\nu$, NH_3, 1 h	 (73)	155
		$h\nu$, NH_3, 15 min	 I (15) +  (4)	55
		$h\nu$, THF, 15 min, 0°	I (61)	55
		NH_3, 15 min	 (98)	55
		NH_3, 15 min	 (60)	55
				54
X R				
Cl Bu-*t*		K, NH_3	(42)	
Cl Bu-*t*		$h\nu$, NH_3, 1.25 h	(60-65)	
Cl Ph		NH_3, 16 h	(39)	
Cl Ph		K, NH_3	(47)	
Cl Ph		$h\nu$, NH_3, 1.25 h	(20-25)	
Br Bu-*t*		NH_3, 16 h	(20-25)	
Br Bu-*t*		K, NH_3	(30)	
Br Bu-*t*		$h\nu$, NH_3, 1.25 h	(70-75)	
Br Ph		NH_3, 16 h	(30)	
Br Ph		K, NH_3	(42)	
Br Ph		$h\nu$, NH_3, 1.25 h	(25-30)	
		$h\nu$, NH_3, 15 min	 (75)	140
		$h\nu$, NH_3, 0.5 h	 (70)	153, 154

[a] This compound decomposes in contact with air.

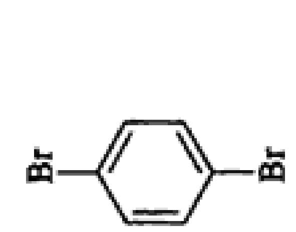
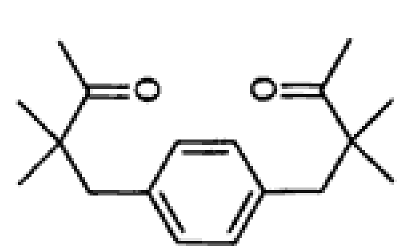
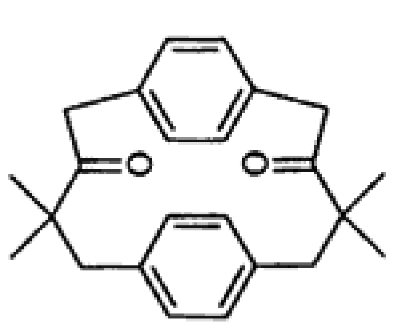
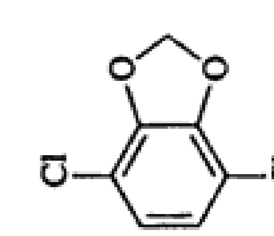
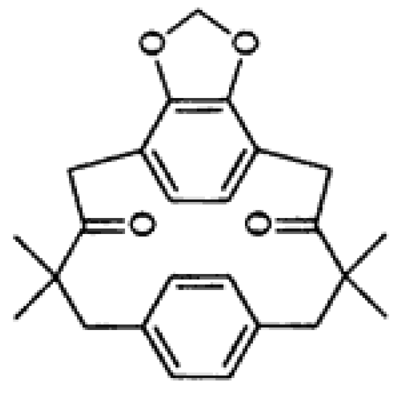
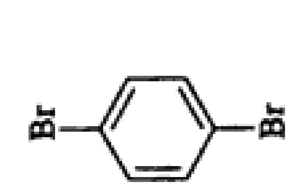
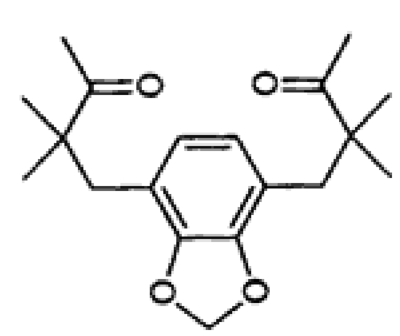
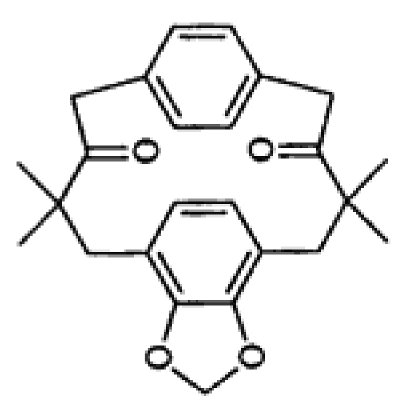
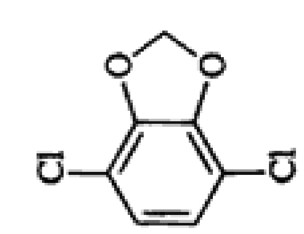
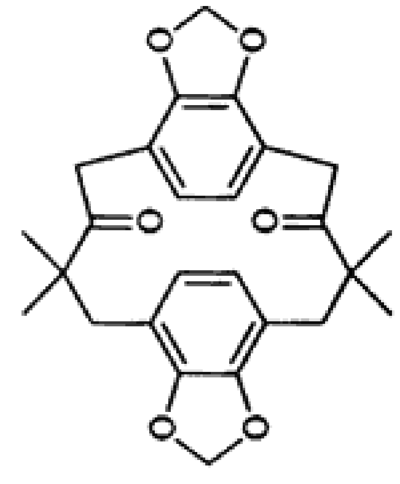
[b] This product is a mixture of dihydro and tetrahydro derivatives.

[c] The potassium salt of the nucleophile was used.

[d] A $LiNH_2$:nucleophile ratio of 3 was used.

TABLE IX. RING CLOSURE REACTIONS (*Continued*)

C. Miscellaneous (*Continued*)

Substrate	Nucleophile	Conditions	Product(s) and Yield(s) (%)	Refs.
		*hν*, *t*-BuOK, NH_3, 15 min	 (10)	307
		*hν*, *t*-BuOK, NH_3, 15 min	 (3)	307
		*hν*, *t*-BuOK, NH_3, 15 min	 (7)	307
		*hν*, *t*-BuOK, NH_3, 15 min	 (5)	307

REFERENCES

[1] Kornblum, N.; Michel, R. E.; Kerber, R. C. *J. Am. Chem. Soc.* **1966**, *88*, 5662.

[2] Russell, G. A.; Danen, W. C. *J. Am. Chem. Soc.* **1966**, *88*, 5663.

[3] Kim, J. K.; Bunnett, J. F. *J. Am. Chem. Soc.* **1970**, *92*, 7463.

[4] Kim, J. K.; Bunnett, J. F. *J. Am. Chem. Soc.* **1970**, *92*, 7464.

[5] Rossi, R. A.; Pierini A. B.; Peñéñory, A. B. In *The Chemistry of Functional Groups*, Patai S.; Rappoport, Z.; Eds., Wiley, Chichester, 1995; Suppl. D2, Ch 24, p. 1395.

[6] Bowman, W. R. *Chem. Soc. Rev.* **1988**, *17*, 283.

[7] Rossi, R. A.; Pierini, A. B.; Palacios, S. M. *Adv. Free Rad. Chem.*, Tanner, D. D., Ed., Jai Press, **1990**, *1*, 193.

[8] Albini, A.; Fasani, E.; Mella, M. *Topics Curr. Chem.* **1993**, *168*, 143.

[9] Soumillion, J. P. *Topics Curr. Chem.* **1993**, *168*, 93.

[10] Bowman, W. R. In *Photoinduced Electron Transfer*, Fox, M. A.; Chanon, M.; Eds., Part C, Elsevier, The Hague, 1988, p. 487.

[11] Lablache-Combier, A. In *Photoinduced Electron Transfer*, Fox, M. A.; Chanon, M.; Eds., Part C, Elsevier, The Hague, 1988, p. 134.

[12] Julliard, M.; Chanon, M. *Chem. Rev.* **1983**, *83*, 425.

[13] Norris, R. K. In *Comprehensive Organic Synthesis*, Trost, B. M.; Ed., Pergamon Press, 1991, Vol. 4, p. 451.

[14] Chanon, M.; Rajzmann, M.; Chanon, F. *Tetrahedron* **1990**, *46*, 6193.

[15] Rossi, R. A.; de Rossi, R. H. In *Aromatic Substitution by the $S_{RN}1$ Mechanism*, ACS, Washington, D.C., 1983, p. 178.

[16] Rossi, R. A. *Acc. Chem. Res.* **1982**, *15*, 164.

[17] Bunnett, J. F. *Acc. Chem. Res.* **1978**, *11*, 413.

[18] Todres, Z. V. *Russian Chem. Rev.* **1978**, *47*, 148.

[19] Savéant, J. M. *Tetrahedron* **1994**, *50*, 10117.

[20] Savéant, J. M. *Acc. Chem. Res.* **1993**, *26*, 455.

[21] Savéant, J. M. *New J. Chem.* **1992**, *16*, 131.

[22] Pinson, J.; Savéant, J. M. *Electrorg. Synth.* **1991**, *29*, 29.

[23] Savéant, J. M. *Adv. Phys. Org. Chem.* **1990**, *26*, 1.

[24] Andrieux, C. P.; Hapiot, P.; Savéant, J. M. *Chem. Rev.* **1990**, *90*, 723.

[25] Evans, D. H. *Chem. Rev.* **1990**, *90*, 739.

[26] Savéant, J. M. *Bull. Soc. Chim. Fr.* **1988**, 225.

[27] Savéant, J. M. *Acc. Chem. Res.* **1980**, *13*, 323.

[28] Kornblum, N. *Aldrichim. Acta* **1990**, *23*, 71.

[29] Degrand, C.; Prest, R.; Compagnon, P. L. *Electrorg. Synth.* **1991**, *29*, 45.

[30] Bunnett, J. F.; Mitchel, E.; Galli, C. *Tetrahedron* **1985**, *41*, 4119.

[31] Beugelmans, R. *Bull. Soc. Chim. Belg.* **1984**, *93*, 547.

[32] Wolfe, J. F.; Carver, D. R. *Org. Prep. Proced. Int.* **1978**, *10*, 225.

[33] Beckwith, A. L. J.; Palacios, S. M. *J. Phys. Org. Chem.* **1991**, *4*, 404.

[34] Petrillo, G.; Novi, M.; Garbarino, G.; Filiberti, M. *Tetrahedron Lett.* **1988**, *29*, 4185.

[35] Abeywickrema, A. N.; Beckwith, A. L. J. *J. Am. Chem. Soc.* **1986**, *108*, 8227.

[36] Meijs, G. F.; Beckwith, A. L. J. *J. Am. Chem. Soc.* **1986**, *108*, 5890.

[37] Galli, C.; Bunnett, J. F. *J. Am. Chem. Soc.* **1981**, *103*, 7140.

[38] Galli, C.; Bunnett, J. F. *J. Am. Chem. Soc.* **1979**, *101*, 6137.

[39] Ettayeb, R.; Savéant, J. M.; Thiébault, A. *J. Am. Chem. Soc.* **1992**, *114*, 10990.

[40] Amatore, C.; Gareil, M.; Oturan, M. A.; Pinson, J.; Savéant, J. M.; Thiébault, A. *J. Org. Chem.* **1986**, *51*, 3757.

[41] Borosky, G. L.; Pierini, A. B.; Rossi, R. A. *J. Org. Chem.* **1992**, *57*, 247.

[42] Rossi, R. A.; de Rossi, R. H.; Pierini, A. B. *J. Org. Chem.* **1979**, *44*, 2662.

[43] Bunnett, J. F.; Gloor, B. F. *J. Org. Chem.* **1973**, *38*, 4156.

[44] Rossi, R. A.; de Rossi, R. H.; Lopez, A. F. *J. Org. Chem.* **1976**, *41*, 3367.

[45] Rossi, R. A.; de Rossi, R. H.; Lopez, A. F. *J. Am. Chem. Soc.* **1976**, *98*, 1252.

[46] Rossi, R. A.; de Rossi, R. H.; Lopez, A. F. *J. Org. Chem.* **1976**, *41*, 3371.
[47] Yakubov, A. P.; Belen'kii, L. I.; Goldfarb, Y. L. *Izv. Akad. Nauk SSSR, Ser. Khim.* **1981**, 2812; *Chem. Abstr.* **1982**, *96*, 104044r.
[48] Rossi, R. A.; Palacios, S. M. *J. Org. Chem.* **1981**, *46*, 5300.
[49] Beugelmans, R.; Bois-Choussy, M.; Boudet, B. *Tetrahedron* **1983**, *39*, 4153.
[50] Denney, D. B.; Denney, D. Z. *Tetrahedron* **1991**, *47*, 6577.
[51] Marquet, J.; Jiang, Z.; Gallardo, I.; Batlle, A.; Cayon, E. *Tetrahedron Lett.* **1993**, *34*, 2801.
[52] Rossi, R. A.; Palacios, S. M. *Tetrahedron* **1993**, *49*, 4485.
[53] Bunnett, J. F. *Tetrahedron* **1993**, *49*, 4477.
[54] Oostvee, E. A.; van der Plas, H. C. *Recl. Trav. Chim. Pays-Bas* **1979**, *98*, 441.
[55] Carver, D. R.; Komin, A. P.; Hubbard, J. S.; Wolfe, J. F. *J. Org. Chem.* **1981**, *46*, 294.
[56] Carver, D. R.; Hubbard, J. S.; Wolfe, J. F. *J. Org. Chem.* **1982**, *47*, 1036.
[57] Dell'Erba, C.; Novi, M.; Petrillo, G.; Tavani, C. *Tetrahedron* **1993**, *49*, 235.
[58] Dell'Erba, C.; Novi, M.; Petrillo, G.; Tavani, C. *Tetrahedron* **1992**, *48*, 325.
[59] Dell'Erba, C.; Novi, M.; Petrillo, G.; Tavani, C.; Bellandi, P. *Tetrahedron* **1991**, *47*, 333.
[60] Bordwell, F. G.; Zhang, X-M.; Filler, R. *J. Org. Chem.* **1993**, *58*, 6067.
[61] Bordwell, F. G.; Zhang, X-M. *Acc. Chem. Res.* **1993**, *26*, 510.
[62] Scamehorn, R. G.; Hardacre, J. M.; Lukanich, J. M.; Sharpe, L. R. *J. Org. Chem.* **1984**, *49*, 4881.
[63] Scamehorn, R. G.; Bunnett, J. F. *J. Org. Chem.* **1977**, *42*, 1449.
[64] Beugelmans, R.; Chbani, M. *New J. Chem.* **1994**, *18*, 949.
[65] Boumekouez, A.; About-Jaudet, E.; Collignon, N. *J. Organomet. Chem.* **1992**, *440*, 297.
[66] Wu, B. Q.; Zeng, F. W.; Ge, M.-J.; Cheng, X-Z.; Wu, G.-S. *Sci. China* **1991**, *34*, 777; *Chem. Abstr.* **1992**, *116*, 58463h.
[67] Cheng, C.; Stock, L. M. *J. Org. Chem.* **1991**, *56*, 2436.
[68] Hoz, S.; Bunnett, J. F. *J. Am. Chem. Soc.* **1977**, *99*, 4690.
[69] Fox, M. A.; Yaunathan, J.; Fryxell, G. E. *J. Org. Chem.* **1983**, *48*, 3109.
[70] Tolbert, L. M.; Siddiqui, S. *J. Org. Chem.* **1984**, *49*, 1744.
[71] Swartz, J. E.; Bunnett, J. F. *J. Org. Chem.* **1979**, *44*, 340.
[72] Swartz, J. E.; Bunnett, J. F. *J. Org. Chem.* **1979**, *44*, 4673.
[73] Scamehorn, R. G.; Bunnett, J. F. *J. Org. Chem.* **1979**, *44*, 2604.
[74] Bowman, W. R.; Heaney, H.; Smith, P. H. G. *Tetrahedron Lett.* **1982**, *23*, 5093.
[75] Galli, C.; Bunnett, J. F. *J. Org. Chem.* **1984**, *49*, 3041.
[76] van Leeuwen, M.; McKillop, A. *J. Chem. Soc., Perkin Trans. 1* **1993**, 2433.
[77] Galli, C.; Gentili, P. *J. Chem. Soc., Perkin Trans. 2* **1993**, 1135.
[78] Murguía, M. C.; Rossi, R. A. *Tetrahedron Lett.* **1997**, *38*, 1355.
[79] Curran, D. P.; Fevig, T. L.; Jasperse, C. P.; Totleeben, M. J. *Synlett* **1992**, 943, and references cited therein.
[80] Nazareno, M. A.; Rossi, R. A. *Tetrahedron Lett.* **1994**, *35*, 5185.
[81] Savéant, J. M. *Adv. Electron Transfer Chem.* **1994**, *4*, 53.
[82] Swartz, J. E.; Stenzel, T. T. *J. Am. Chem. Soc.* **1984**, *106*, 2520.
[83] Amatore, C.; Oturan, M. A.; Pinson, J.; Savéant, J. M.; Thiébault, A. *J. Am. Chem. Soc.* **1984**, *106*, 6318.
[84] Alam, N.; Amatore, C.; Combellas, C.; Thiébault, A.; Verpeaux, J. N. *J. Org. Chem.* **1990**, *55*, 6347.
[85] Amatore, C.; Combellas, C.; Lebbar, N. E.; Thiébault, A.; Verpeaux, J. N. *J. Org. Chem.* **1995**, *60*, 18.
[86] Amatore, C.; Pinson, J.; Savéant, J. M.; Thiébault, A. *J. Am. Chem. Soc.* **1981**, *103*, 6930.
[87] Amatore, C.; Savéant, J. M.; Combellas, C.; Robveille, S.; Thiébault, A. *J. Electroanal. Chem.* **1985**, *184*, 25.
[88] Pinson, J.; Savéant, J. M. *J. Am. Chem. Soc.* **1978**, *100*, 1506.
[89] Amatore, C.; Pinson, J.; Savéant, J. M.; Thiébault, A. *J. Am. Chem. Soc.* **1982**, *104*, 817.
[90] Andrieux, C. P.; Savéant, J. M.; Su, K. B. *J. Phys. Chem.* **1986**, *90*, 3815.
[91] Amatore, C.; Oturan, M. A.; Pinson, J.; Savéant, J. M.; Thiébault, A. *J. Am. Chem. Soc.* **1985**, *107*, 3451.
[92] Amatore, C.; Combellas, C.; Pinson, J.; Oturan, M. A.; Robveille, S.; Savéant, J. M.; Thiébault, A. *J. Am. Chem. Soc.* **1985**, *107*, 4846.
[93] M'Halla, F.; Pinson, J.; Savéant, J. M. *J. Am. Chem. Soc.* **1980**, *102*, 4120.
[94] Rossi, R. A.; Bunnett, J. F. *J. Am. Chem. Soc.* **1972**, *94*, 683.
[95] Andrieux, C. P.; Savéant, J. M. *J. Am. Chem. Soc.* **1993**, *115*, 8044.
[96] Bard, R. R.; Bunnett, J. F.; Creary, X.; Tremelling, M. J. *J. Am. Chem. Soc.* **1980**, *102*, 2852.
[97] Tremelling, M. J.; Bunnett, J. F. *J. Am. Chem. Soc.* **1980**, *102*, 7375.
[98] Palacios, S. M.; Asis, S. E.; Rossi, R. A. *Bull. Soc. Chim. Fr.* **1993**, *130*, 111.
[99] Austin, E.; Alonso, R. A.; Rossi, R. A. *J. Chem. Res.* **1990**, 190.
[100] Astruc, D. *Angew. Chem., Int. Ed. Engl.* **1988**, *27*, 643, and references cited therein.
[101] Austin, E.; Ferrayoli, C. G.; Alonso, R. A.; Rossi, R. A. *Tetrahedron* **1993**, *49*, 4495.
[102] Austin, E.; Alonso, R. A.; Rossi, R. A. *J. Org. Chem.* **1991**, *56*, 4486.
[103] Galli, C. *Gazz. Chim. Ital.* **1988**, *118*, 365.
[104] Bartak, D. E.; Danen, W. C.; Hawley, M. D. *J. Org. Chem.* **1970**, *35*, 1206.
[105] Beugelmans, R.; Bois-Choussy, M. *Tetrahedron Lett.* **1988**, *29*, 1289.
[106] Beugelmans, R.; Roussi, G. *Tetrahedron* **1981**, *37*, 393.
[107] Beugelmans, R.; Bois-Choussy, M.; Boudet, B. *Tetrahedron* **1982**, *38*, 3479.
[108] Bunnett, J. F.; Sundberg, J. E. *Chem. Pharm. Bull.* **1975**, *23*, 2620.
[109] Danen, W. C.; Kenslet, T. T.; Lawless, J. C.; Marcus, M. F.; Hawley, M. D. *J. Phys. Chem.* **1969**, *73*, 4389.
[110] Compton, R. G.; Dryfe, R. A. W.; Fisher, A. C. *J. Electroanal. Chem.* **1993**, *361*, 275.
[111] Compton, R. G.; Dryfe, R. A. W.; Fisher, A. C. *J. Chem. Soc., Perkin Trans. 2* **1994**, 1581.
[112] Compton, R. G.; Dryfe, R. A. W.; Eklund, J. C.; Page, S. D.; Hirst, J.; Nei, L. B.; Fleet, G. W. J.; Hsia, K. Y.; Bethell, D.; Martingale, L. J. *J. Chem. Soc., Perkin Trans. 2* **1995**, 1673.
[113] Galli, C. *Tetrahedron* **1988**, *44*, 5205.
[114] Novi, M.; Petrillo, G.; Dell'Erba, C. *Tetrahedron Lett.* **1987**, *28*, 1345.
[115] Petrillo, G.; Novi, M.; Garbarino, G.; Dell'Erba, C. *Tetrahedron* **1987**, *43*, 4625.
[116] Bunnett, J. F.; Shafer, S. J. *J. Org. Chem.* **1978**, *43*, 1873.
[117] Pierini, A. B.; Peñéñory, A. B.; Rossi, R. A. *J. Org. Chem.* **1984**, *49*, 486.
[118] Rossi, R. A.; Alonso, R. A.; Palacios, S. M. *J. Org. Chem.* **1981**, *46*, 2498.
[119] Alonso, R. A.; Rossi, R. A. *J. Org. Chem.* **1982**, *47*, 77.
[120] Pierini, A. B.; Rossi, R. A. *J. Organomet. Chem.* **1979**, *168*, 163.
[121] Rossi, R. A. *J. Chem. Educ.* **1982**, *59*, 310.
[122] Pierini, A. B.; Rossi, R. A. *J. Org. Chem.* **1979**, *44*, 4667.
[123] Galli, C.; Gentili, P.; Guarnieri, A. *Gazz. Chim. Ital.* **1995**, *125*, 409.
[124] Rossi, R. A.; Bunnett, J. F. *J. Org. Chem.* **1973**, *38*, 3020.
[125] Pierini, A. B.; Baumgartner, M. T.; Rossi, R. A. *J. Org. Chem.* **1991**, *56*, 580.
[126] Alonso, R. A.; Bardon, A.; Rossi, R. A. *J. Org. Chem.* **1984**, *49*, 3584.
[127] Novi, M.; Garbarino, G.; Petrillo, G.; Dell'Erba, C. *Tetrahedron* **1990**, *46*, 2205.
[128] Tolbert, L. M.; Siddiqui, S. *Tetrahedron* **1982**, *38*, 1079.
[129] Tolbert, L. M.; Martone, D. P. *J. Org. Chem.* **1983**, *48*, 1185.
[130] Fox, M. A.; Singletary, N. J. *J. Org. Chem.* **1982**, *47*, 3412.
[131] Konigsberg, I.; Jagur-Grodzinski, J. *J. Polym. Sci. Polym. Chem. Ed.* **1984**, *22*, 2713.
[132] Tour, J. M.; Stephens, E. B. *J. Am. Chem. Soc.* **1991**, *113*, 2309.
[133] Tour, J. M.; Stephens, E. B.; Davis, J. F. *Macromolecules* **1992**, *25*, 499.
[134] Moon, M. P.; Komin, A. P.; Wolfe, J. F.; Morris, G. F. *J. Org. Chem.* **1983**, *48*, 2392.
[135] Semmelhack, M. F.; Bargar, T. M. *J. Am. Chem. Soc.* **1980**, *102*, 7765.
[136] Rossi, R. A.; Bunnett, J. F. *J. Org. Chem.* **1973**, *38*, 1407.
[137] Komin, A. P.; Wolfe, J. F. *J. Org. Chem.* **1977**, *42*, 2481.
[138] Scamehorn, R. G.; Bunnett, J. F. *J. Org. Chem.* **1977**, *42*, 1457.

[139] Estel, L.; Marsais, F.; Queguiner, G. *J. Org. Chem.* **1988**, *53*, 2740.
[140] Wolfe, J. F., Virginia Polytechnic Institute and State University, unpublished results.
[141] Dillender, S. C.; Greenwood, T. D.; Hendi, M. S.; Wolfe, J. F. *J. Org. Chem.* **1986**, *51*, 1184.
[142] Hay, J. V.; Wolfe, J. F. *J. Am. Chem. Soc.* **1975**, *97*, 3702.
[143] Bunnett, J. F.; Sundberg, J. E. *J. Org. Chem.* **1976**, *41*, 1702.
[144] Moon, M. P.; Wolfe, J. F. *J. Org. Chem.* **1979**, *44*, 4081.
[145] Beugelmans, R.; Ginsburg, H. *J. Chem. Soc., Chem. Commun.* **1980**, 508.
[146] Bard, R. R.; Bunnett, J. F. *J. Org. Chem.* **1980**, *45*, 1546.
[147] Beugelmans, R.; Bois-Choussy, M. *Synthesis* **1981**, 730.
[148] Beugelmans, R.; Boudet, B.; Quintero, L. *Tetrahedron Lett.* **1980**, *21*, 1943.
[149] Beugelmans, R.; Ginsburg, H. *Heterocycles* **1985**, *23*, 1197.
[150] Beltran, L.; Galvez, C.; Prats, M.; Salgado, J. *J. Heterocyclic Chem.* **1992**, *29*, 905.
[151] Prats, M.; Galvez, C.; Beltran, L. *Heterocycles* **1992**, *34*, 1039.
[152] Bunnett, J. F.; Gloor, B. F. *Heterocycles* **1976**, *5*, 377.
[153] Nair, V.; Chamberlain, S. D. *J. Am. Chem. Soc.* **1985**, *107*, 2183.
[154] Nair, V.; Chamberlain, S. D. *J. Org. Chem.* **1985**, *50*, 5069.
[155] Beugelmans, R.; Bois-Choussy, M. *Heterocycles* **1987**, *26*, 1863.
[156] Wu, B. Q.; Zeng, F. W.; Zhao, Y.; Wu, G. S. *Chin. J. Chem.* **1992**, *10*, 253; *Chem. Abstr.* **1993**, *118*, 124792j.
[157] Hay, J. V.; Hudlicky, T.; Wolfe, J. F. *J. Am. Chem. Soc.* **1975**, *97*, 374.
[158] Beugelmans, R.; Bois-Choussy, M.; Tang, Q. *J. Org. Chem.* **1987**, *52*, 3880.
[159] Baumgartner, M. T.; Gallego, M. L.; Pierini, A. B. *J. Org. Chem.* **1998**, *63*, 6394.
[160] Bunnett, J. F.; Creary, X. *J. Org. Chem.* **1975**, *40*, 3740.
[161] Dell'Erba, C.; Novi, M.; Petrillo, G.; Tavani, C. *Phosphorus, Sulfur, and Silicon* **1993**, *74*, 409.
[162] Dell'Erba, C.; Novi, M.; Petrillo, G.; Tavani, C. *Tetrahedron* **1994**, *50*, 11239.
[163] Dell'Erba, C.; Novi, M.; Petrillo, G.; Tavani, C. *Tetrahedron* **1994**, *50*, 3529.
[164] Ferrayoli, C. G.; Palacios, S. M.; Alonso, R. A. *J. Chem. Soc., Perkin Trans. 1* **1995**, 1635.
[165] Bunnett, J. F.; Singh, P. *J. Org. Chem.* **1981**, *46*, 5022.
[166] Alonso, R. A.; Rossi, R. A. *J. Org. Chem.* **1980**, *45*, 4760.
[167] Carver, D. R.; Greenwood, T. D.; Hubbard, J. S.; Komin, A. P.; Sachdeva, Y. P.; Wolfe, J. F. *J. Org. Chem.* **1983**, *48*, 1180.
[168] Beugelmans, R.; Ginsburg, H.; Bois-Choussy, M. *J. Chem. Soc., Perkin Trans. 1* **1982**, 1149.
[169] Wong, J.-W.; Natalie, K. J., Jr.; Nwokogu, G. C.; Pisipati, J. S.; Flaherty, P. T.; Greenwood, T. D.; Wolfe, J. F. *J. Org. Chem.* **1997**, *62*, 6152.
[170] Semmelhack, M. F.; Bargar, T. M. *J. Org. Chem.* **1977**, *42*, 1481.
[171] Rossi, R. A.; Alonso, R. A. *J. Org. Chem.* **1980**, *45*, 1239.
[172] Alonso, R. A.; Rodriguez, C. H.; Rossi, R. A. *J. Org. Chem.* **1989**, *54*, 5983.
[173] Lotz, G. A.; Palacios, S. M.; Rossi, R. A. *Tetrahedron Lett.* **1994**, *35*, 7711.
[174] Goldfarb, Y. L.; Ikubov, A. P.; Belen'kii, L. I. *Khim. Geterotsikl. Soedin.* **1979**, 1044; *Chem. Abstr.* **1979**, *91*, 193081n.
[175] Wu, B. Q.; Fanwen, Z.; Li, W.; Zhao, Y.; Wu, G. S. *Chin. J. Chem.* **1992**, *10*, 73; *Chem. Abstr.* **1992**, *117*, 89658a.
[176] Du, R.; Huang, W. *Jinan Daxue Xuebao, Ziran Kexue Yu Yixueban* **1991**, *12*, 46; *Chem. Abstr.* **1992**, *117*, 48037d.
[177] Hermann, C. K. F.; Sachdeva, Y. P.; Wolfe, J. F. *J. Heterocyclic Chem.* **1987**, *24*, 1061.
[178] Wolfe, J. F.; Greene, J. C.; Hudlicky, T. *J. Org. Chem.* **1972**, *37*, 3199.
[179] Combellas, C.; Lequan, M.; Lequan, R. M.; Simon, J.; Thiébault, A. *J. Chem. Soc., Chem. Commun.* **1990**, 542.
[180] Oturan, M. A.; Pinson, J.; Savéant, J. M.; Thiébault, A. *Tetrahedron Lett.* **1989**, *30*, 1373.
[181] Beugelmans, R.; Chastanet, J. *Tetrahedron* **1993**, *49*, 7883.
[182] Beugelmans, R.; Bois-Choussy, M.; Gayral, P.; Rigothier, M. C. *Eur. J. Med. Chem.* **1988**, *23*, 539.
[183] Tona, M.; Sanchez-Baeza, F.; Messeguer, A. *Tetrahedron* **1994**, *50*, 8117.
[184] Brunet, J-J.; Sidot, C.; Caubere, P. *J. Organomet. Chem.* **1980**, *204*, 229.

[185] Dneprovskii, A. S.; Tuchkin, A. I. *Russian J. Org. Chem.* **1994**, *30*, 435.
[186] Brunet, J.-J.; Sidot, C.; Loubinoux, B.; Caubere, P. *J. Org. Chem.* **1979**, *44*, 2199.
[187] Loubinoux, B.; Fixari, B.; Brunet, J.-J.; Caubere, P. *J. Organometal. Chem.* **1976**, *105*, C22.
[188] Brunet, J.-J.; Sidot, C.; Caubere, P. *Tetrahedron Lett.* **1981**, *22*, 1013.
[189] Brunet, J.-J.; Sidot, C.; Caubere, P. *J. Org. Chem.* **1983**, *48*, 1166.
[190] Brunet, J.-J.; Sidot, C.; Caubere, P. *J. Org. Chem.* **1983**, *48*, 1919.
[191] Kashimura, T.; Kudo, K.; Mori, S.; Sugita, N. *Chem. Lett.* **1986**, 299.
[192] Kashimura, T.; Kudo, K.; Mori, S.; Sugita, N. *Chem. Lett.* **1986**, 483.
[193] Kashimura, T.; Kudo, K.; Mori, S.; Sugita, N. *Chem. Lett.* **1986**, 851.
[194] Kudo, K.; Shibata, T.; Kashimura, T.; Mori, S.; Sugita, N. *Chem. Lett.* **1987**, 577.
[195] Brunet, J. J.; Taillefer, M. *J. Organomet. Chem.* **1989**, *361*, C1.
[196] Brunet, J. J.; de Montauzon, D.; Taillefer, M. *Organometallics* **1991**, *10*, 341.
[197] Brunet, J. J.; El Zaizi, A. *J. Organomet. Chem.* **1995**, *486*, 275.
[198] Brunet, J. J.; Chauvin, R. *Chem. Soc. Rev.* **1995**, 89.
[199] Brunet, J. J.; Taillefer, M. *J. Organomet. Chem.* **1990**, *384*, 193.
[200] Brunet, J. J.; El Zaizi, A. *Bull. Soc. Chim. Fr.* **1996**, *133*, 75.
[201] Tashiro, M. *Synthesis* **1979**, 921.
[202] Boy, P.; Combellas, C.; Thiébault, A. *Synlett* **1991**, 923.
[203] Combellas, C.; Gautier, H.; Simon, J.; Thiébault, A.; Tournilhac, F.; Barzoukas, M.; Josse, D.; Ledoux, I.; Amatore, C.; Verpeaux, J.-N. *J. Chem. Soc., Chem. Commun.* **1988**, 203.
[204] Alam, N.; Amatore, C.; Combellas, C.; Thiébault, A.; Verpeaux, J. N. *Tetrahedron Lett.* **1987**, *28*, 6171.
[205] Alam, N.; Amatore, C.; Combellas, C.; Pinson, J.; Savéant, J. M.; Thiébault, A.; Verpeaux, J. N. *J. Org. Chem.* **1988**, *53*, 1496.
[206] Boy, P.; Combellas, C.; Suba, C.; Thiébault, A. *J. Org. Chem.* **1994**, *59*, 4482.
[207] Boy, P.; Combellas, C.; Thiébault, A.; Amatore, C.; Jutand, A. *Tetrahedron Lett.* **1992**, *33*, 491.
[208] Boy, P.; Combellas, C.; Fielding, S.; Thiébault, A. *Tetrahedron Lett.* **1991**, *32*, 6705.
[209] Beugelmans, R.; Chastanet, J. *Tetrahedron Lett.* **1991**, *32*, 3487.
[210] Combellas, C.; Marzouk, H.; Suba, C.; Thiébault, A. *Synthesis* **1993**, 788.
[211] Beugelmans, R.; Bois-Choussy, M.; Tang, Q. *Tetrahedron Lett.* **1988**, *29*, 1705.
[212] Pierini, A. B.; Baumgartner, M. T.; Rossi, R. A. *Tetrahedron Lett.* **1988**, *29*, 3451.
[213] Combellas, C.; Suba, C.; Thiébault, A. *Tetrahedron Lett.* **1994**, *35*, 5217.
[214] Beugelmans, R.; Bois-Choussy, M.; Chastanet, J.; Legleuher, M.; Zhu, J. *Heterocycles* **1993**, *36*, 2723.
[215] Beugelmans, R.; Bois-Choussy, M. *J. Org. Chem.* **1991**, *56*, 2518.
[216] Petrillo, G.; Novi, M.; Dell'Erba, C. *Tetrahedron Lett.* **1989**, *30*, 6911.
[217] Petrillo, G.; Novi, M.; Dell'Erba, C.; Tavani, C.; Berta, G. *Tetrahedron* **1990**, *46*, 7977.
[218] Amatore, C.; Combellas, C.; Robveille, S.; Savéant, J. M.; Thiébault, A. *J. Am. Chem. Soc.* **1990**, *108*, 4754.
[219] Dell'Erba, C.; Houmam, A.; Novi, M.; Petrillo, G.; Pinson, J. *J. Org. Chem.* **1993**, *58*, 2670.
[220] Bunnett, J. F.; Gloor, B. F. *J. Org. Chem.* **1974**, *39*, 382.
[221] Wursthorn, K. R.; Kuivila, H. G.; Smith, G. F. *J. Am. Chem. Soc.* **1978**, *100*, 2789.
[222] Wursthorn, K. R.; Kuivila, H. G. *J. Organomet. Chem.* **1977**, *140*, 29.
[223] Yammal, C. C.; Podesta, J. C.; Rossi, R. A. *J. Org. Chem.* **1992**, *57*, 5720.
[224] Yammal, C. C.; Podesta, J. C.; Rossi, R. A. *J. Organomet. Chem.* **1996**, *509*, 1.
[225] Rossi, R. A.; Bunnett, J. F. *J. Org. Chem.* **1972**, *37*, 3570.
[226] Pierini, A. B.; Baumgartner, M. T.; Rossi, R. A. *Tetrahedron Lett.* **1987**, *28*, 4653.
[227] Chahma, M.; Combellas, C.; Thiébault, A. *Synthesis* **1994**, 366.
[228] Chahma, M.; Combellas, C.; Marzouk, H.; Thiébault, A. *Tetrahedron Lett.* **1991**, *32*, 6121.
[229] Chahma, M.; Combellas, C.; Thiébault, A. *J. Org. Chem.* **1995**, *60*, 8015.
[230] Medebielle, M.; Oturan, M. A.; Pinson, J.; Savéant, J. M. *Tetrahedron Lett.* **1993**, *34*, 3409.
[231] Bunnett, J. F.; Traber, R. P. *J. Org. Chem.* **1978**, *43*, 1867.
[232] Bunnett, J. F.; Creary, X. *J. Org. Chem.* **1974**, *39*, 3612.
[233] Beugelmans, R.; Chbani, M. *Bull. Soc. Chim. Fr.* **1995**, *132*, 306.

[234] Beugelmans, R.; Chbani, M. *Bull. Soc. Chim. Fr.* **1995**, *132*, 290.
[235] Bulot, J. J.; Aboujaoude, E. E.; Collignon, N.; Savignac, P. *Phosphorus Sulfur* **1984**, *21*, 197.
[236] Bowman, W. R.; Taylor, P. F. *J. Chem. Soc., Perkin Trans. 1* **1990**, 919.
[237] Beugelmans, R.; Chbani, M. *Bull. Soc. Chim. Fr.* **1995**, *132*, 729.
[238] Bard, R. R.; Bunnett, J. F.; Traber, R. P. *J. Org. Chem.* **1979**, *44*, 4918.
[239] Bunnett, J. F.; Shafer, S. J. *J. Org. Chem.* **1978**, *43*, 1877.
[240] Bornancini, E. R. N.; Rossi, R. A. *J. Org. Chem.* **1990**, *55*, 2332.
[241] Manzo, P. G.; Palacios, S. M.; Alonso, R. A. *Tetrahedron Lett.* **1994**, *35*, 677.
[242] Bornancini, E. R. N.; Alonso, R. A.; Rossi, R. A. *J. Organomet. Chem.* **1984**, *270*, 177.
[243] Zoltewicz, J. A.; Oestreich, T. M. *J. Org. Chem.* **1991**, *56*, 2805.
[244] Beugelmans, R.; Bois-Choussy, M. *Tetrahedron* **1986**, *42*, 1381.
[245] Chbani, M.; Bouillon, J-P.; Chastanet, J.; Souflaoui, M.; Beugelmans, R. *Bull. Soc. Chim. Fr.* **1995**, *132*, 1053.
[246] Beugelmans, R.; Ginsburg, H. *Tetrahedron Lett.* **1987**, *28*, 413.
[247] Bunnett, J. F.; Creary, X. *J. Org. Chem.* **1974**, *39*, 3173.
[248] Julliard, M.; Chanon, M. *J. Photochem.* **1986**, *34*, 231.
[249] Kondo, S.; Nakanishi, M.; Tsuda, K. *J. Heterocyclic Chem.* **1984**, *21*, 1243.
[250] Peñéñory, A. B.; Rossi, R. A. *J. Phys. Org. Chem.* **1990**, *3*, 266.
[251] Zoltewicz, J. A.; Oestreich, T. M. *J. Am. Chem. Soc.* **1973**, *95*, 6863.
[252] Zoltewicz, J. A.; Locko, G. A. *J. Org. Chem.* **1983**, *48*, 4214.
[253] Novi, M.; Garbarino, G.; Petrillo, G.; Dell'Erba, C. *J. Org. Chem.* **1987**, *52*, 5382.
[254] van Tilborg, W. J. M.; Smit, C. J. *Tetrahedron Lett.* **1977**, *41*, 3651.
[255] van Tilborg, W. J. M.; Smit, C. J.; Scheele, J. J. *Tetrahedron Lett.* **1977**, 2113.
[256] Pinson, J.; Savéant, J. M. *J. Chem. Soc., Chem. Commun.* **1974**, 923.
[257] Genesty, M.; Thobie, C.; Gautier, A.; Degrand, C. *J. Appl. Electrochem.* **1993**, *23*, 1125.
[258] Gautier, C. T.; Genesty, M.; Degrand, C. *J. Org. Chem.* **1991**, *56*, 3452.
[259] Amatore, C.; Pinson, J.; Savéant, J. M.; Thiébault, A. *J. Electroanal. Chem.* **1981**, *123*, 231.
[260] Amatore, C.; Chaussard, J.; Pinson, J.; Savéant, J. M.; Thiébault, A. *J. Am. Chem. Soc.* **1979**, *101*, 6012.
[261] Petrillo, G.; Novi, M.; Garbarino, G.; Dell'Erba, C. *Tetrahedron Lett.* **1985**, *26*, 6365.
[262] Petrillo, G.; Novi, M.; Garbarino, G.; Dell'Erba, C. *Tetrahedron* **1986**, *42*, 4007.
[263] Amatore, C.; Beugelmans, R.; Bois-Choussy, M.; Combellas, C.; Thiébault, A. *J. Org. Chem.* **1989**, *54*, 5688.
[264] Bunnett, J. F.; Creary, X. *J. Org. Chem.* **1974**, *39*, 3611.
[265] Hobbs, D. W.; Still, W. C. *Tetrahedron Lett.* **1987**, *28*, 2805.
[266] Petrillo, G.; Novi, M.; Garbarino, G.; Filiberti, M. *Tetrahedron* **1989**, *45*, 7411.
[267] Cevasco, G.; Novi, M.; Petrillo, G.; Thea, S. *Gazz. Chim. Ital.* **1990**, *120*, 131.
[268] Rossi, R. A.; Peñéñory, A. B. *J. Org. Chem.* **1981**, *46*, 4580.
[269] Sandman, D. J.; Stark, J. C.; Acampora, L. A.; Gagne, P. *Organometallics* **1983**, *2*, 549.
[270] Sandman, D. J.; Li, L.; Tripathy, S.; Stark, J. C.; Acampora, L. A.; Foxman, B. M. *Organometallics* **1994**, *13*, 348.
[271] Sandman, D. J.; Rubner, M.; Samuelson, L. *J. Chem. Soc., Chem. Commun.* **1982**, 1133.
[272] Acampora, L. A.; Dugger, D. L.; Emma, T.; Mohammed, J.; Rubner, M. F.; Samuelson, L.; Sandman, D. J.; Tripathy, S. K. *Polymers in Electronics, ACS Symposium Series No. 242*, Davidson, T., Ed., 1995, p. 461.
[273] Suzuki, H.; Inouye, M. *Chem. Lett.* **1985**, 389.
[274] Suzuki, H.; Padmanabhan, S.; Inouye, M.; Ogawa, T. *Synthesis* **1989**, 468.
[275] Suzuki, H.; Nakamura, T. *Synthesis* **1992**, 549.
[276] Thobie-Gautier, C.; Degrand, C. *J. Org. Chem.* **1991**, *56*, 5703.
[277] Degrand, C.; Prest, R. *J. Electroanal. Chem.* **1990**, *282*, 281.
[278] Thobie-Gautier, C.; Degrand, C. *J. Electroanal. Chem.* **1993**, *344*, 383.
[279] Genesty, M.; Merle, O.; Degrand, C.; Nour, M.; Compagnon, P. L.; Lemaitre, J. P. *Denki Kagaku* **1994**, *62*, 1158; *Chem. Abstr.* **1995**, *122*, 225147r.
[280] Degrand, C.; Prest, R.; Compagnon, P. L. *J. Org. Chem.* **1987**, *52*, 5229.
[281] Degrand, C.; Prest, R.; Nour, M. *Phosphorus Sulfur* **1988**, *38*, 201.

[282] Degrand, C. *J. Org. Chem.* **1987**, *52*, 1421.
[283] Degrand, C. *J. Chem. Soc., Chem. Commun.* **1986**, 1113.
[284] Degrand, C. *J. Electroanal. Chem.* **1987**, *238*, 239.
[285] Degrand, C. *Tetrahedron* **1990**, *46*, 5237.
[286] Beugelmans, R.; Roussi, G. *J. Chem. Soc., Chem. Commun.* **1979**, 950.
[287] Boujlet, K.; Simonet, J.; Roussi, G.; Beugelmans, R. *Tetrahedron Lett.* **1982**, *23*, 173.
[288] Fontan, R.; Galvez, C.; Viladoms, P. *Heterocycles* **1981**, *16*, 1473.
[289] Beugelmans, R.; Bois-Choussy, M. *Tetrahedron* **1992**, *48*, 8285.
[290] Beugelmans, R.; Chastanet, J.; Roussi, G. *Tetrahedron Lett.* **1982**, *23*, 2313.
[291] Beugelmans, R.; Chastanet, J.; Roussi, G. *Tetrahedron* **1984**, *40*, 311.
[292] Beugelmans, R.; Chastanet, J.; Ginsburg, H.; Quinteros-Cortes, L.; Roussi, G. *J. Org. Chem.* **1985**, *50*, 4933.
[293] Beugelmans, R.; Bois-Choussy, M.; Tang, Q. *Tetrahedron* **1989**, *45*, 4203.
[294] Petrillo, G.; Novi, M.; Dell'Erba, C.; Tavani, C. *Tetrahedron* **1991**, *47*, 9297.
[295] Semmelhack, M. F.; Stauffer, R. D.; Rogerson, T. D. *Tetrahedron Lett.* **1973**, 4519.
[296] Semmelhack, M. F.; Chong, B. P.; Stauffer, R. D.; Rogerson, T. D.; Chong, A.; Jones, L. D. *J. Am. Chem. Soc.* **1975**, *97*, 2507.
[297] Weinreb, S. M.; Semmelhack, M. F. *Acc. Chem. Res.* **1975**, *8*, 158.
[298] Wolfe, J. F.; Sleevi, M. C.; Goehring, R. R. *J. Am. Chem. Soc.* **1980**, *102*, 3646.
[299] Goehring, R. R.; Sachdeva, Y. P.; Pisipati, J. S.; Sleevi, M. C.; Wolfe, J. F. *J. Am. Chem. Soc.* **1985**, *107*, 435.
[300] Goehring, R. R. *Tetrahedron Lett.* **1992**, *33*, 6045.
[301] Goehring, R. R. *Tetrahedron Lett.* **1994**, *35*, 8145.
[302] Martin, S. F.; Liras, S. *J. Am. Chem. Soc.* **1993**, *113*, 10450.
[303] Wiegand, S.; Schafer, H. J. *Tetrahedron* **1995**, *51*, 5341.
[304] Theuns, H. G.; Lenting, H. B. M.; Salemink, C. A.; Tanaka, H.; Shibata, M.; Ito, K.; Lousberg, J. J. C. *Heterocycles* **1984**, *22*, 2007.
[305] Pierini, A. B.; Baumgartner, M. T.; Rossi, R. A. *J. Org. Chem.* **1987**, *52*, 1089.
[306] Fukazawa, Y.; Usui, S.; Tanimoto, K.; Hirai, Y. *J. Am. Chem. Soc.* **1994**, *116*, 8169.
[307] Fukazawa, Y.; Kitayama, H.; Yasuhara, K.; Yoshimura, K.; Usui, S. *J. Org. Chem.* **1995**, *60*, 1696.
[308] Baumgartner, M. T.; Pierini, A. B.; Rossi, R. A. *J. Org. Chem.* **1993**, *58*, 2593.
[309] Raston, C. L.; Salem, G. In *The Chemistry of the Metal-Carbon Bond*, Hartley, F. R.; Patai, S., Eds.; Wiley, New York, 1987; Vol. 4, p. 159.
[309a] Collman, J. P.; Hegedus, L. S.; Norton, J. R.; Finke, R. G. In *Principles and Applications of Organotransition Metal Chemistry*, University Science Books: Mill Valley, 1987.
[310] Stille, J. K. *Pure Appl. Chem.* **1985**, *57*, 1771.
[310a] Stille, J. K. *Angew. Chem., Int. Ed. Engl.* **1986**, *25*, 508.
[311] Kalinin, V. N. *Synthesis* **1992**, 413, and references cited therein.
[312] Grushin, V. V.; Alper, H. *Chem. Rev.* **1994**, *94*, 1047, and references cited therein.
[313] For recent reviews see: Kalinin, V. N. *Russ. Chem. Rev.* **1987**, *56*, 682. Goldberg, Y. in *Phase Transfer Catalysis: Selected Problems and Applications*, Gordon and Breach Science Publishers, Singapore, 1992.
[314] Fanta, P. E. *Synthesis* **1974**, 9.
[315] Lindley, J. *Tetrahedron* **1984**, *40*, 1433, and references cited therein.
[316] Couture, C.; Paine, A. J. *Can. J. Chem.* **1985**, *63*, 111.
[317] Semmelhack, M. F.; Helquist, P. M.; Jones, L. D. *J. Am. Chem. Soc.* **1971**, *94*, 9234.
[318] Grushin, V. V. *Acc. Chem. Res.* **1992**, *25*, 529.
[318a] Grushin, V. V.; Demkina, I. I.; Tolstaya, T. P. *Inorg. Chem.* **1991**, *30*, 1760.
[319] Chen, Z.-C.; Jin, Y.-Y.; Stang, P. J. *J. Org. Chem.* **1987**, *52*, 4115.
[319a] Hampton, K. G.; Harris, T. M.; Hauser, C. R. *J. Org. Chem.* **1964**, *19*, 3511.
[320] Bruggink, A.; McKillop, A. *Tetrahedron* **1975**, *31*, 2607.
[321] Setsune, J.; Matsukawa, K.; Wakemoto, H.; Kitao, T. *Chem. Lett.* **1981**, 367.
[321a] Setsune, J.; Matsukawa, K.; Kitao, T. *Tetrahedron Lett.* **1982**, 663.
[321b] Osuka, A.; Kobayashi, T.; Suzuki, H. *Synthesis* **1983**, 67.