Activated Iridium Oxide (AIROF) and Thermal Iridium Oxide (TIROF): Use in animal studies and *in vivo* stability.

1.	Weiland JD and Anderson DJ; "Chronic neural stimulation with thin-film, iridium oxide electrodes," IEEE Trans Biomed Eng 2000 Jul;47(7):911-8.
2.	Niebauer MJ; Yamanouchi Y; Hills D; Mowrey K; Wilkoff BL; Tchou PJ; "Voltage dependence of ICD lead polarization and the effect of iridium oxide coating," Pacing Clin Electrophysiol 2000 May;23(5):818-23.
3.	Marzouk SAM; Ufer S; Buck RP; Johnson TA; Dunlap LA; Casico; "Electrodeposited iridium oxide pH electrode for measurement of extracellular myocardial acidosis during acute ischemia," 1998, 70, 5054-5061.
4.	Niebauer MJ; Wilkoff B; Yamanouchi Y; Mazgalev T Mowrey K; Tchou P; "Iridium oxide-coated defibrillation electrode: reduced shock polarization and improved defibrillation efficacy," Circulation 1997 Nov 18;96(10):3732-6.
5.	Liu X; McCreery DB; Carter RR; Bullara LA; Yuen TGH; Agneww WF; "Stability of the interface between neural tissue and chronically implanted intracortical microelectrodes," IEEE Trans. Rehab. Eng. 1999, 7(3) 315-326.
6.	McCreery DB; Yuen TG; Agnew WF; Bullara LA; "A characterization of the effects on neuronal excitability due to prolonged microstimulation with chronically implanted microelectrodes," IEEE Trans Biomed Eng 1997 Oct;44(10):931-9.
7.	Woodford BJ; Carter RR; McCreery D; Bullara LA; Agnew WF; "Histopathologic and physiologic effects of chronic implantation of microelectrodes in sacral spinal cord of the cat," J Neuropathol Exp Neurol 1996 Sep;55(9) 982-91.
8.	McCreery DB; Yuen TG; Agnew WF; Bullara LA, "Stimulus parameters affecting tissue injury during microstimulation in the cochlear nucleus of the cat," Hear Res 1994 Jun 15;77(1-2):105-15.
9.	Akin T; Najafi K; Smoke RH; Bradley RM; "A micromachined silicon sieve electrode for nerve regeneration applications," IEEE Trans Biomed Eng 1994 Apr;41(4):305-13.
10.	McCreery DB; Yuen TG; Agnew WF; Bullara LA; "Stimulation with chronically implanted microelectrodes in the cochlear nucleus of the cat: histologic and physiologic effects," Hear Res 1992 Sep;62(1):42-56.
11.	Adler S; Spehr P; Allen J; Block W; "Chronic animal testing of new cardiac pacing electrodes," Pacing Clin Electrophysiol 1990 Dec;13(12 Pt 2):1896-900.
12.	McCreery DB; Agnew WF; Yuen TG; Bullara L; "Charge density and charge per phase as cofactors in neural injury induced by electrical stimulation," IEEE Trans Biomed Eng 1990 Oct;37(10):996-1001.
13.	Evans DE; Niparko JK; Miller JM; Jyung RW; Anderson DJ; "Multiple-channel stimulation of the cochlear nucleus," Otolaryngol Head Neck Surg 1989 Dec;101(6):651-7.
14.	Anderson DJ; Najafi K; Tanghe SJ; Evans DA; Levy KL; Hetke JF; Xue XL; Zappia JJ; Wise KD ; Batch-fabricated thin-film electrodes for stimulation of the central auditory system," IEEE Trans Biomed Eng 1989 Jul;36(7):693-704.
15.	Agnew WF; Yuen TG; McCreery DB; Bullara LA; "Histopathologic evaluation of prolonged intracortical electrical stimulation," Exp Neurol 1986 Apr;92(1):162-85.
16.	McCreery DB; Bullara LA; Agnew WF; "Neuronal activity evoked by chronically implanted intracortical microelectrodes," Exp Neurol 1986 Apr;92(1):147-61.

Iridium Oxide (TIROF or AIROF): Clinical Studies

17.	Kindermann M; Schwaab B; Frohlig G; Lawall P Schieffer H; "Bipolar active fixation atrial leads: comparison of two new lead models," Pacing Clin Electrophysiol 1998 Nov;21(11 Pt 2):2285-90.
18.	Frohlig G; Bolz A; Strobel J; Rutz M; Lawall P; Schwerdt H; Schaldach M; Schieffer H; "A fractally coated, 1.3 mm2 high impedance pacing electrode," Pacing Clin Electrophysiol 1998 Jun;21(6):1239-46.
19.	Tyers GF; Mills P; Clark J; Cheesman M; Yeung-Lai-Wah JA; Brownlee RR; "Bipolar leads for use with permanently implantable cardiac pacing systems: a review of limitations of traditional and coaxial configurations and the development and testing of new conductor, insulation, and electrode designs," J Invest Surg 1997 Jan-Apr;10(1-2):1-15.
20.	Schmidt EM; Bak MJ; Hambrecht FT; Kufta CV; O'Rourke DK; Vallabhanath P; "Feasibility of a visual prosthesis for the blind based on intracortical microstimulation of the visual cortex," Brain 1996 Apr;119 (Pt 2):507-22.
21.	Del Bufalo AG; Schlaepfer J; Fromer M; Kappenberger L; "Acute and long-term ventricular stimulation thresholds with a new, iridium oxide-coated electrode," Pacing Clin Electrophysiol 1993 Jun;16(6):1240-4.
22.	Bolz A; Hubmann M; Hardt R; Riedmuller J; Schaldach M; "Low polarization pacing lead for detecting the ventricular-evoked response," Med Prog Technol 1993;19(3):129-37.
23.	Del Bufalo AG; Schlapfer J; Fromer M; Kappenberger L; "Long term stimulation thresholds with a new, iridium oxide-coated electrode," PACE, 1992, 15, p. 578 (NASPE Abstract).
24.	Bak M; Girvin JP; Hambrecht FT; Kufta CV; Loeb GE; Schmidt; "Visual sensations produced by intracortical microstimulation of the human occipital cortex," Med. & Biol. Eng. & Comput. 1990 28, 257-259.
25.	Hambrecht, FT; "Visual prostheses based on direct interfaces with the visual system," Bulliere's Clinical Neurology, 1995, 4 147-165.

General Iridium Oxide References

26.	Blau A; Ziegler C; Heyer M; Endres F; Schwitzgebel G; Matthies T; Stieglitz T; Meyer JU; Gopel W; "Characterization and optimization of microelectrode arrays for in vivo nerve signal recording and stimulation," Biosens Bioelectron, 1997 12 883-892
27.	Ziaie B; Nardin MD; Coghlan AR; Najafi K; "A single-channel implantable microstimulator for functional neuromuscular stimulation," IEEE Trans Biomed Eng 1997 Oct;44(10):909-20
28.	Loeb GE; Peck RA; Martyniuk J; "Toward the ultimate metal microelectrode," J Neurosci Methods 1995 Dec;63(1-2):175-83
29.	Ruddy HA; Loeb GE; "Influence of materials and geometry on fields produced by cochlear electrode arrays," Med Biol Eng Comput 1995 Nov;33(6):793-801
30.	Akin T; Najafi K; Smoke RH; Bradley RM; "A micromachined silicon sieve electrode for nerve regeneration applications," IEEE Trans Biomed Eng. 1994 41 305-13
31.	Kovacs GT; Storment CW; Rosen JM; "Regeneration microelectrode array for peripheral nerve recording and stimulation," IEEE Trans Biomed Eng 1992 Sep;39(9):893-902
32.	Loeb GE; Zamin CJ; Schulman JH; Troyk PR; "Injectable microstimulator for functional electrical stimulation," Med Biol Eng Comput 1991 Nov;29(6):NS13-9
33.	Robblee LS; Rose TL; "Electrochemical guidelines for selection of protocols and electrode

	materials for neural stimulation," in Neural Prostheses: Fundamental Studies, W. F. Agnew and D. B. McCreery, eds., Prentice Hall, Englewood Cliffs, NJ, pp. 25-66 (1990).
34.	Robblee LS; Rose TL; "The electrochemistry of electrical stimulation," Proc. Thirteenth Intl. Conf. IEEE Eng. Med. Biol. Soc., **12**, 1479-1480 (1990).
35.	Klein JD; Clauson SL; Cogan SF; "Morphology and charge capacity of sputtered iridium oxide films," J. Vac Sci Technol., 1989 A7 3043-3047.
36.	Klein JD; Clauson SL; Cogan SF; "The influence of substrate bias on the morphology and charge capacity of RF-sputtered iridium oxide films," J. Mater. Res., **4**, 1505-1510 (1989).
37.	Aurian-Blajeni B; Boucher MM; Kimball AG; Robblee LS; "Physicochemical characterization of sputtered iridium oxide," J. Mater. Res., **4**, 440-446 (1989).
38.	Kelliher EM; Rose TL; "Evaluation of charge injection properties of thin film redox materials for use in neural prostheses," Mat. Res. Soc. Symp. Proc., **110**, 23-27 (1989).
39.	Beebe X; Rose TL "Charge injection limits of activated iridium oxide electrodes with 0.2 ms pulses in bicarbonate buffered saline," IEEE Trans Biomed Eng 1988 Jun;35(6):494-5
40.	Aurian-Blajeni B; Beebe X; Rauh RD; Rose TL; "Impedance of hydrated iridium oxide electrodes," Electrochim. Acta, **34**, 795-802 (1988).
41.	Ballestrasse CL; Beck TR; "*In vitro* life tests of faradaic neural stimulation electrodes at high current densities," IEEE Trans. Biomed. Eng. 1988, 35, pp. 870-874.
42.	Robblee LS; Mangaudis MJ; Lasinsky ED; Kimball AG; Brummer SB; "Charge injection properties of thermally-prepared iridium oxide films," Mat. Res. Soc. Symp. Proc. Vol 55, 1986 303-310.
43.	Robblee LS; Lefko JL; Brummer SB; "Activated Ir: An electrode suitable for reversible charge injection in saline," J. Electrochem. Soc., 1983, 130, 731-733.

References with uncertain electrode materials.

44.	Zrenner, B; Ndrepepa G; Mussig D; Stobe C; Schneider MAE; Karch MR; Plewan A; Schomig A; Schmitt C; "The recording of monophasic action potentials with fractal-coated iridium electrodes in humans," PACE, 2000, 23, pp. 54-62.
45.	Zrenner, B; Mussig D; Schreieck J; Weyerbrock S; Schneider M; Schaldach M; Schomig A; Schmitt C; "Intraoperative recordings of monophasic action potentials with chronically implantable pacemaker leads," PACE, 1998, 21, pp. 235-238.
46.	DeCharms RC; Blake DT; Merzenich MM; "A multiple implant device for the cerebral cortex," J. Neuroscience Methods, 1999, 93, pp. 27-35.