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Program#/Poster#:	3171/B539
Abstract Title:	**Cold Sputtering Iridium Oxide Films And Their Properties As Impantable Materials For Retinal Electrode**
Presentation Start/End Time:	Tuesday, May 02, 2006, 3:00 PM - 4:45 PM
Location:	Hall B/C
Reviewing Code:	299 retinal prostheses - RE
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Keywords:	673 retina, 725 transplantation

Purpose: Sputtered iridium oxide film (SIROF) offers excellent electrical properties as site material for stimulating electrodes, even superior to those of activated iridium oxide film (AIROF). Cold (unheated) sputtering of the film is needed when the stimulating electrode has materials such as polymer materials that cannot be heated above a critical temperature. However, cold sputtering can cause degradation of the film performance. To make stable micro-porous films with high charge storage capacity without heating of substrate, optimization of sputtering parameters was investigated.
Methods: The iridium oxide films were produced by use of the RF-power sputtering at various plasma conditions. The sputtering process was performed in the power of 250 W without heating of the substrate (cold sputtering). All films were deposited on the Ti adhesion layer preformed on Si (100) wafer. After depositing SIROF's up to 1000nm in thickness to form electrode sites, Charge storage capability of the films was measured. CV-curves measured in the range of 0.1~100 kHz and 25 mVpp sweep were used, recorded in phosphate buffered solution with pH 7.4.
Results: The component ratio between Ir and IrOx was changed by varying the oxygen flow rate which ranged from 0 to 40 sccm. Surface roughness was used as a guide for optimization. An optimum was found at 12 sccm. At this condition, charge storage capacity was measured to be about 60mC/cm^2, which is even higher than that of heated SIROFs (32 mC/cm^2 ; J. D. Kleins et al. 1989). Post-sputtering activation resulted in further enhancement. The measured charge storage capacity values are compared to those obtained from heated SIROF's, AIROF's, Au and Pt.
Conclusions: Optimization of process parameters was done for cold sputtered IrOx films. The produces films showed excellent electrical performance. The performance of cold SIROF's were superior to those of other films studied. We expect that the cold SIROF's would be an excellent site material choice for implantable stimulating electrode.

Commercial Relationship:	**S. Kim**, None; **E. Kim**, None; **S. Kim**, None.
Support:	NBS-ERC supported by KOSEF, Korea