The study of planar - type multichannel microelectrode for recording neural signal

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ABSTRACT

Planar - type multichannel microelectrode is developed for culturing neurons and recording action potentials of them. When recording the potentials, characteristics the passivation layer are very important because the electrode is surrounded with solution that has various ions. As a result of experiments. the impedance of dielectrics changed as time passed. The impedance of silicon dioxide was greatly decreased. And impedance was almost same in case of the sandwich - structured layer. But the impedance of the silicon nitride layer decreased little. Beside the impedance of the passivation layer has increases by increasing the depth of the nitride layer. To decrease the impedance of electrode, platinum black was electroplated on electrode site. For many reduction potential the electroplatings are performed. the optimum condition and was SEM(Scanning according to viewing the Electron Microscopy) of the plated sites and measuring the impedance of the electrode before and after plating.

(pyrex 7740 4 inch diameter) (Au) (adhesion layer) (500A) (3000A) (300A) e - gun evaporator (Photo Resist) 가 (lift - off) (silicon oxide) (silicon nitride), **PECVD**

(Plasma Enhanced Chemical Vapor Deposition) bonding pad recording site (AZ1512)

10M _ mpedance(Ω) 100k silicon dioxide silicon nitride 10 Time(hour)

(at 1kHz)

가

3 CHI (Potentiostat) 660A model 가 가 가 가 가 가 가 가 (pinhole) . 가 (b) 환원전위가 -0.8V 인 경우 (a) 환원전위가 -0.4V 인 경우 가 가 가 (c) 환원전위가 -1.15V 인 경우 (d) 환원전위가 -1.6V 인 경우√ 3. SEM 가 가 3_{μ} m 27M 가 가 1.15V Impedance Magnitude (12) [1] David A. Borkholder, 1998, Cell Based Biosensors Using Microelectrodes, paper for Ph. D. degree, Stanford university [2] , 2000, 100k 10 100 10k Frequency (Hz) 2. (: 995 - 0900 - 001 - 2) -0.4V, -0.8V, -1.15V, - 1.6V 2 2