

# Preliminary Program

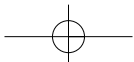
# THE **Aging Eye** ARVO 2007 ANNUAL MEETING



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### **Application of the Blister Test to Assess Reliability of Polyimide Based Retinal Electrode**

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*Abstract:*

**Purpose:** Deadhesion of metal/polyimide interface resulting from environmental aging had been reported as a common failure mechanism of polyimide dielectric. To assess the structural reliability of the polyimide based retinal electrode, a methodology to characterize the adhesion of metal/polyimide interface using blister and *In vitro* accelerated soak tests is proposed. The blister test is a reliable method for the adhesion measurement between a thin film and a rigid substrate, and its sample has a similar structure to the polyimide based retinal electrode.

**Methods:** Blister test samples were designed and fabricated with consideration to the structure of the polyimide based retinal electrode consisting of polyimide/polyimide, titanium/polyimide and polyimide/titanium/gold layers. The blister test apparatus was customized for these test samples which have no rigid substrate. Each sample was put in a test tube filled with phosphate buffered saline for performing *In vitro* accelerated soak tests at 90°C in a forced convection oven. During the soak tests, the adhesion of each sample was regularly measured with the blister test for monitoring the long term reliability.

**Results:** The adhesion between thin films could be measured with the customized circular blister test. The results of the blister test were recorded by the critical pressure (psi) indicating the adhesion strength between thin films. The accelerated soak tests at 90°C had performed on the adhesion test samples for 4 weeks. During 4 weeks, the adhesion of polyimide/polyimide interlayer had maintained an average critical pressure around 40 psi and the adhesion of polyimide/titanium interlayer had also maintained an average critical pressure about 25 psi.

**Conclusions:** The blister and *In vitro* accelerated soak tests are useful for comparing the reliability of various metal/polyimide interfaces in a relatively short time. The results obtained from this experiment show that the adhesion of polyimide/polyimide interface is stronger than the adhesion of titanium/polyimide interface during the 4 weeks soak tests at 90°C. An additional experiment with soak tests at 75°C is currently in progress for estimating the degradation rate of the adhesion at 37°C using the Arrhenius equation.

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\*Clinical Trial : No

**Clinical Trial Explanation :** This research is only about prosthetic device reliability without clinical trials.

**\*Newsworthy** : No

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