

Biosensing of biophysical characterization by metal-aluminum nitride-metal capacit

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Abstract

Aluminum nitride thin films were fabricated as stress biosensors for biosensing cell attachment. The features and capacitance of AlN films following cell culture were detected via leakage current density and biocompatibility testing. Analytical results demonstrate that the failure of the capacitors produced slit-like microvoids to form on the AlN film, following cell differentiation and proliferation. Slit-like microvoids incurred substantial current leaking of the cell cultured-capacitor, even at a low breakdown voltage. Stress variation during cell differentiation and proliferation were responsible for the formation of microvoids and the low breakdown voltage. The stress produced lattice distortion of the AlN film, resulting in a piezoelectric effect on the AlN film surface. Results of this study demonstrate that the piezoelectric AlN film is highly promising as a biosensing film.