

Measurement of Electric Contact Phenomenon Using LiNbO₃ Piezoelectric Actuator

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Abstract- An Au-Au contact gap was controlled by a LiNbO₃ piezoelectric actuator. The control accuracy of the actuator was in the submicron range. Neither hysteresis nor creep was observed. Contact voltage, contact current, displacement of electrodes, and driving voltage of the actuator were continuously recorded for the opening contact. Measurement data for 1,500 contact operations (100 operations × 15 steps of current value) were processed by a computer. Discharge and bridge phenomena were analyzed. For the electrical discharge phenomena, arc ignition probability, arc duration, average arc current and arc disappearance distance were derived. The length of the bridge and the bridge resistance were derived for the bridge phenomenon. Our derived value for minimum arc ignition current corresponds to a value obtained by Holm. Our measurement of bridge resistance is confirmed by Φ - Θ relation. It shows our measurement apparatus and analytical technique are appropriate for contact phenomena measurement.