(Abstract No#211)

TABLE I. CURRENT DENSITY AND VOLUME RESISTIVITY

	Distance from the sample, mm			
	Non	120	160	200
Current density, nA/cm^2	16.0	0.275	0.186	0.102
Volume resistivity, Ωm	N/A	1.16×10^{13}	1.46×10^{13}	1.87×10^{13}

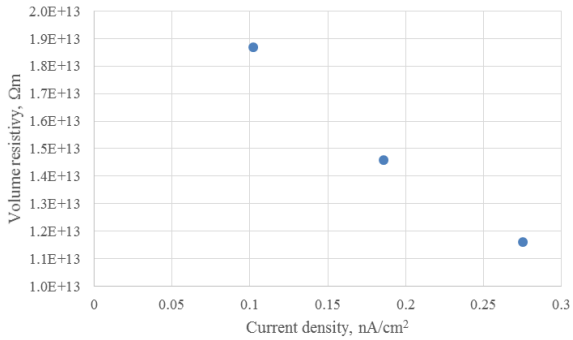

Fig. 10. Volume resistivity and current density

in (2)[9] and the dose rate affects the radiation induced conductivity (RIC) as shown in (3)[10].

$$\dot{D} = |J_b| / \left[\rho_m q_e b (E_b)^{n-1}\right], \quad (2)$$

where, $\dot{D}$ is a dose rate, J_b is a current density, ρ_m is a density, q_e is the elementary charge and E_b is electron energy.

$$g = g_0 \dot{D}^{\Delta}, \quad (3)$$

where, g is a radiation induced conductivity, g_0 is a conductivity of a material before irradiation and Δ is a parameter which is determined through experiments. These model equations also indicate that higher electron current density will cause conductivity enhancement and thus resistivity decline as observed in our experimental result.

IV. CONCLUDING REMARKS

The surface potential histories of electron irradiated cover glass with coating layer are clarified. The electron beam is diffused by putting aluminum foils on the beam line and the current density is varied by moving the foils. In the case of no-foil irradiation, the current density is so high that the positive potential appears after the irradiation stopped because of intensive ionization of metallic atoms consisting the coating material during irradiation. On the contrary, when the electron density is suppressed by the foils, the surface potential of the cover glass remains negative through the measurement period. Because the electron density is directly related to the dose rate, the ionization is also suppressed in the case of lower current densities. Volume resistivity of the cover glass is also calculated and it is observed that the lower the current density is the higher the conductivity becomes as described RIC model. Although the cover glass coating is utilized for reflecting unnecessary wavelength range of sun light, it may cause positive potential relative to the spacecraft base potential which may induce partial discharge.

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