(Abstract No 231)

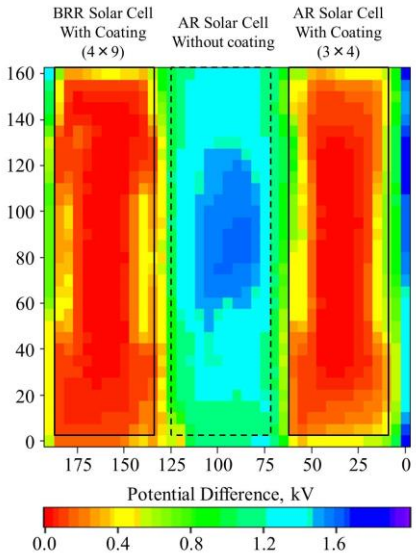

Fig. 17. Surface potential of solar cell coupon after 115-thermal cycling during arcing test under 7-keV electron beam.

TABLE V. ARCING TEST RESULTS AFTER 115 THERMAL CYCLES

Coupon Panel		**Electron Beam Energy**		
		@ 7 keV	***@ 8 keV***	***@ 9 keV***
AR solar cell	without coating	11	3	0
	with coating (3×4)[c]	0	0	0
BRR solar cell	with coating (4×9)[c]	0	0	0

[c.] (Number of Coating Scan on the Whole Area × Number of Coating Scan on the Edge)

V. SUMMARY

There was no arcing on the coated solar cell coupon during the on-orbit demonstration tests. We have verified the arcing prevention performance of semi-conductive coating for solar array paddle on satellite. However, the electrical power loss due to the coating was 35.5%. The power loss was too high to coat the semi-conductive coating agent on solar array paddles actually mounted on satellites. To reduce the power loss due to the coating consistent with the high charging mitigation performance, we have tried to improve the semi-conductive coating agent and the coating process. Using the improved semi-conductive coating agent, the electrical power loss of 11% have been achieved. The coating have kept the charging mitigation and arcing prevention performance after 115-times thermal cycling. To put the coating into practical use, we would achieve following:

1) Environmental durability: It would be evaluated that the coated solar cell coupon withstands the exposure to space environmental conditions such as charged particle radiation and ultraviolet rays with thermal cycle.

2) Coating wettability: In this study, we have achieved the charging mitigation and arcing prevention performance in plural coating operations. Unfortunately, we cannot achieve it in only one time coating operation. This is caused by the coating wettability with the surface materials on solar cell coupon panel. On the solar array paddle, there are many kinds of materials that are silicone adhesive, silver, polyimide, cover glass, and the coating on cover glass. To cover on solar array paddle and make the conductive path in only one time coating operation, we must ensure the coating wettability with various surface materials on solar array paddle.

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