§60. Resistivities of Metal Powder Loaded Graphites for Oxidation in Air at High Temperatures

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In order to investigate the resistivities of graphites, we measured the weight loss of 6 different types of graphites (isotropic graphite 1: IG-A, isotropic graphite 2: IG-B, low density isotropic graphite: IG-C, high density isotropic graphite: IG-D, isotropic graphite 3: IG-E, high purity isotropic graphite: IG-F) at 450, 550 and 650 ℃ for 3 hours in air. Also we studied chemical resistivities for 6 metal powders of V, Fe, Ni, Sn, W, and Pb with the chemical reagent grade. The test pieces were checked for appearance, weight change, size, density, and SEM picture before and after being heated.

The test pieces cut from a single lot block had the size of 10mm×10mm×60 mm with a hole of 15 mm in diameter×5 mm in depth for mounting metal powder.

The measured weight losses of graphites without metal powder are found to be 0.3 % or less for all the pieces tested after being heated at 450 ℃, 0.5% or less at 550 ℃, except for IG-B (1.23%) and IG-C (3.60%), and 14 % or more at 650 ℃, except for IG-E (5.8%) and IG-F (1.5 %).

The weight losses of graphites with metal powder are summarized in Fig. 1 which shows three types of weight loss behavior: the first type (IG-A and IG-B) shows large weight loss at high temperatures, the second (IG-C and IG-D) , small weight loss even at high temperatures and the third (IG-E and IG-F) small wight loss both with and without metal powder at high temperatures, except for those with Pb.

The present results of the weight loss measurements of various graphites can be summarized as follows:

1) Even the same type graphites with different raw materials and different procedures induce the significantly different resistivity for oxidation in air.

2) High purity isotropic graphites have generally strong resistivity, meanwhile low density graphites weak resistivity for oxidation in air.

3) Apparent weight loss does not show any relationship between metal powders and graphites.

The present results suggest that graphites whose resistivities are strongly dependent upon the procedures in the original production and mixed metal powders, should be carefully selected according to the conditions they will be used in.

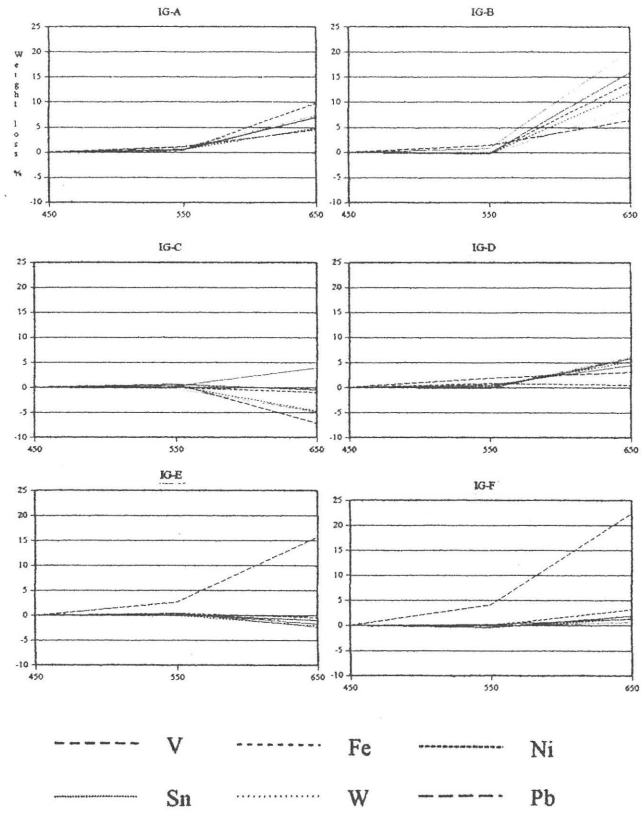

Fig. 1. Weight loss (%) of graphites heated at 450, 550 and 650 ℃ in air for 3 hours with various metal powders.

References

1) Nakayama,Y., Kunimoto,E., Hirano,H., and Hosokawa, K., Extended abstracts of CARBON'94 (Granada) (1994) p.812.

(2) Nakayama, Y., Fujita, K., Kunimoto, E., Okamoto, K., Hirano, H., and Hosokawa, K., Extended Abstr., 22nd Biennial Conf. on Carbon (San Diego) (1995) pp.190-191.