

## The Effect of Pressure in Binders on the Improved Joining Strength of Isotropic Bulk Graphite

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Isotropic bulk graphite is widely used in various industries for heating elements, crucibles, and electrodes. Bulk graphite is typically manufactured by process of powders mixing, forming, carbonization, impregnation, re-carbonization, and graphitization. The bulk graphite is used for complex shapes or large scale. A significant amount of scrap is produced in this process for making complex shapes. Also, investing in facilities for large scale fabrication of bulk graphite is difficult due to the aforementioned manufacturing manufacturing process [1, 2]. In order to overcome this issue, some studies on methods to join small sized pieces of bulk graphite together have been carried out. However, research analyzing the bonding characteristics of bulk graphite is lacking [3]. The final goal is to reach the similar strength with substrate. This study investigated the effect of pressure in a binder on the joining strength of the bonded bulk graphite.

An organic binder was used for joining artificial graphite. The binder was applied to the contact surface of both bulk graphite pieces. One condition was pressured of 20MPa on the contact surface, the other was un-pressed. And then cured in an oven for preliminary bonding. The preliminary bonded specimen was carbonized at 1000 °C to obtain the final bonded specimen. To evaluate the joining strength of the bonded specimen, a load was applied to the interface to make 3 measurements of the flexural strength.

The pressed specimens showed a higher flexural strength than the un-pressed specimens. This was determined to be the result of the un-pressed, which expanded the binder between two artificial graphite during cure.

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