

FLASH JOINING OF GRAPHITE WITH POLYMER DERIVED CERAMIC INTERLAYER

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High-temperature ceramics for structural applications are often characterized by poor machinability and very high melting temperature. Therefore, it is difficult to manufacture them into net-shape large components with complex geometry, with manufacturing technologies such as casting, plastic forming and machining not being viable. Therefore the development of novel joining technologies for high temperature ceramics is of considerable interest. However, ceramic joining is a challenging task because of their high melting temperature; their resistance to plastic deformation; and their brittle behavior (which can cause failure when thermal stresses are developed).

The recent discovery of flash processes and, namely, of flash SPS opens new possible processing routes for the production of ceramic joints. In this work, we investigate the feasibility of a flash joining process for graphite, one of the most refractory materials known. It is shown that effective graphite-graphite joints can be produced by flash SPS in very a few seconds (6 to 10 s) using a pre-ceramic resin as an interlayer.

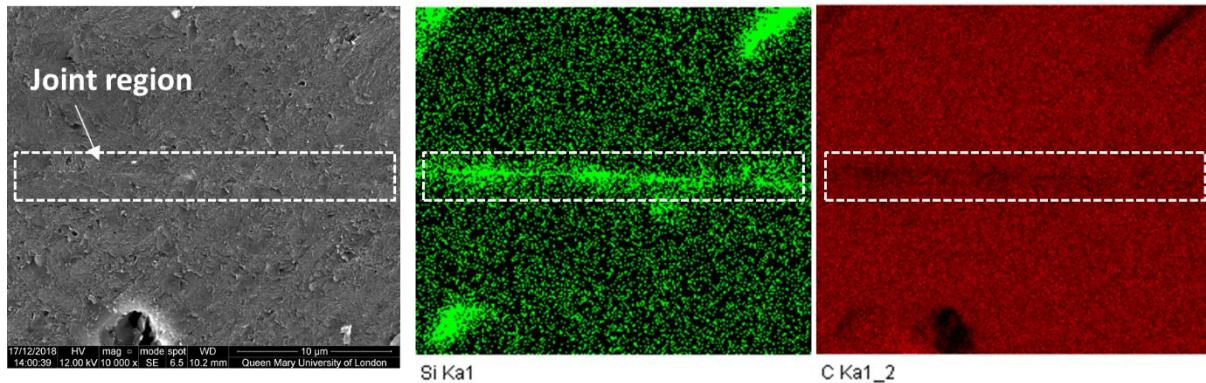


Figure 1 – Flash joined graphite samples.