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Battelle Number(s):

11233

Patent(s) Issued

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Available Technologies

Joining of Ceramics: Tough, High-strength, SiC to SiC Joints

SUMMARY

A method for fabricating tough, high-strength joints between SiC and SiC has been developed. The method utilizes displacement reactions between Si and metal carbides (Mo and Ti). The joints exhibit high-strength bonding to SiC and possess a desirable composite microstructure in the joint region due to the displacement reaction occurring between the Si and metal carbide. This microstructure gives the region high strength and fracture toughness. Joints have been made using the technique at temperatures above and below the melting point of Si (1410 degrees C) so that either solid state or liquid-phase displacement reactions can be used. Joints can be processed using blended powder compacts that are cold-pressed and then hot-pressed or can take advantage of tape calendaring techniques to make a precursor layered tape that can be subsequently hot-pressed to form a joint.

U.S. DEPARTMENT OF ENERGY

Patents & Intellectual Property

» Patent #: 6,165,301

Technology Portfolio(s)

» Materials Forming, Joining and Deposition

Potential Industry Applications

» Chemicals

» Computers & Electronics

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