

Presenting Author S. J. GLASS
 Organization SANDIA NATIONAL LABS (First) (Last)
 Mail Address MS0367
 City/State/Zip ALBUQUERQUE, NM 87185
 Country USA
 Daytime phone (505) 845-3850
 FAX (505) 844-4816 Member No.+ 7606
 E-mail sjglass@sandia.gov

Co-Author B. N. TURMAN
 Organization SANDIA NATIONAL LABS (First) (Last)
 Mail Address MS 1182
 City/State/Zip ALBUQUERQUE, NM 87185
 Country USA
 Daytime phone (505) 845-7119
 FAX (505) 845-3387 Member No.+
 E-mail

Co-Author J. HALBLEIB
 Organization SANDIA NATIONAL LABS (First) (Last)
 Mail Address MS 1179
 City/State/Zip ALBUQUERQUE, NM 87185
 Country USA
 Daytime phone (505) 845-7069
 FAX (505) 845-7841 Member No.+
 E-mail

Co-Author T. VOTH
 Organization SANDIA NATIONAL LABS (First) (Last)
 Mail Address MS 0835
 City/State/Zip ALBUQUERQUE, NM 87185
 Country USA
 Daytime phone (505) 844-6004
 FAX (505) 844-8251 Member No.+
 E-mail

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HIGH ENERGY ELECTRON BEAM JOINING OF CERAMICS, CERMETS, AND GLASSES, S. J. Glass*, B. N. Turman, J. Halbleib, and T. Voth, Sandia National Labs, Albuquerque, NM 87185

We have joined and sealed ceramic, cermet, and glass tubes and coupons using a high energy (10 MeV) electron beam. With a penetration depth of ~1 cm into a typical ceramic this method provides the capability for rapid, transient brazing operations where temperature control of critical components is essential, and the capability for directing energy into a buried, or inaccessible joint. Radiation transport and thermal modeling were used to choose the beam operating parameters. Joints can be produced in less than five minutes for glass frits and active metal brazes. Bonding was evaluated using ultrasonic inspections, hermeticity tests, microstructural characterizations, and shear strength measurements.

This work was supported by the US Dept of Energy under Contract DE-AC04-94AL85000.

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