PLASMA ENHANCED MICROWAVE JOINING, T. YIIN*, M. BARMATZ, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; A. SAYIR, NASA Lewis Research Center, Cleveland, OH.

Wc have developed a plasma enhanced method of joining high purity ceramics at high temperatures. The controlled application of a plasma at the rod interfaces permits the initial heating of low microwave absorbing ceramics to sufficiently high temperatures where they can efficientl y absorb microwave energy. This method also has potential applications to sintering and fiber pulling of advanced ceramics. The technique was applied to the joining of high purity (99.8 %) alumina rods. The microwave joining apparatus was capable of precision allignment of the rods and could apply forces up to 500 lbs to the joint interface. The joining procedure was completed in less than three minutes and required approximately 400 watts of microwave energy. Preliminary four point bending tests indicated fracture strengths of ≥ 100 MPa. SEM microstructural characterization at the vicinity of the joint will be presented.