conferenceseries.com

Res. Rev. J Mat. Sci. 2018, Volume 6
DOI: 10.4172/2321-6212-C1-015

4th International Conference and Expo on

Ceramics and Composite Materials

May 14-15, 2018 | Rome, Italy

Joining and machining of (ZrB_2-SiC) and (Cf-SiC) based composites

R. V. Krishnarao, G. Madhusudan reddy and **V.V.Bhanuprasad**
Defence Metallurgical Research Laboratory, India

ZrB_2-SiC and Cf-SiC based ultra high temperature ceramics (UHTC) are most promising materials for the application in thermal protection systems and high temperature components of future hypersonic aircraft or reentry vehicles. The difficulty in fabricating large size or complex shapes limits the application of these composites. Machining and joining are inevitable requirement for flexible use of advanced ceramics. Diamond machining is an expensive and time consuming process. Low cost near net shape processing of ceramic parts with complex geometries is possible with pressure less sintering (PS). (ZrB_2-SiC-B_4C-YAG) composites have been developed by PS of (ZrB_2-SiC-B_4C) with (Y_2O_3-Al_2O_3) sintering additives at relatively low temperature of 1550-1680°C. Filler materials of (ZrB_2-SiC-B_4C-YAG) composite were developed for tungsten inert gas (TIG) welding of the ZrB_2-SiC and Cf-SiC based composites to themselves and to each other. By incorporation of Cf-SiC short fibre reinforcement the (ZrB_2-SiC-B_4C-YAG) composites were machinable with tungsten carbide tool bit. The joint and machined composite exhibited resistance to oxidation and thermal shock upon exposure to oxy-propane flame at 2300°C for 300 seconds. The combination of (ZrB_2-SiC-B_4C-YAG) and Cf-SiC based composites can be used for making low cost parts like thermal protection system or nozzles for rocket motors.

rvkr4534@yahoo.com