Ceramics international

Volume 43, Issue 3, 2017, Pages 7290-7294

Microstructure and microindentation of Ti3SiC2–Titaniumfiller brazedjoints by tungsten inert gas (TIG) process.

Y. Hadji, A. Tricoteaux, M.G. Ben Ghorbal, M. Yahi, R. Badji, T. Sahraoui, M. Hadji, M.W. Barsoum

Abstract: Herein we study the joining of Ti3SiC2- a MAX phase - with a Tifiller (Ti3SiC2/Ti-filler) using a TIG-brazingprocess. The microstructures of the interfaces were investigated by scanning electron microscopy and energydispersive spectrometry. When Ti3SiC2comes into contact with the molten Ti -filler during the TIG-brazingoperation, it starts decomposing into TiCxand a Si-rich liquid. Simultaneously, the molten Ti infiltrates into theTi3SiC2resulting in a 200 µm thick duplex region, comprised of TiCxand a Ti-rich phase with some dissolved Si.Both Si and C are found in the solidified Ti; the Si source is from the Si-rich liquid, while the presence of Cindicates that some of the C diffused into the Ti. Upon cooling, C- containing Ti- rich lamellae form the solidifiedTi. Microindentation results of the decomposed Ti3SiC2layer show an increase in hardness and a decrease inelastic modulus relative to T3SiC2. Notably, no cracks were observed

Keywords : MAX Phases, Microstructures, Joining, hardness, Micro-indentation