Qin Qi et al., J Mat. Sci. 2017, 5:6
DOI: 10.4172/2321-6212-C1-008



# Microstructure and mechanical properties of SiC/SiC joints brazed with Ti-Ni and Ti-Ni-Zr filler alloy

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SiC ceramic has great potential used in machinery manufacturing, automobile, aerospace and nuclear fields, because of its excellent properties, such as high hardness, good thermal conductivity and good mechanical property at high temperature. However, the intrinsic brittleness of ceramic material limits the application of SiC: It is difficult to fabricate SiC components with large dimension or complex shapes. Joining technique is a promising way to solve this problem. By achieving SiC/SiC joints, we can join small SiC components to large ones, which can embroad the application sphere of SiC. Among several joining methods (brazing, diffusion bonding and self-propagating high-temperature synthesis (SHS) etc.), brazing is widely used in joining ceramics because of its simplicity, good repeatability and good bonding strength. In the past few decades, Ag-Cu-Ti is the most commonly used filler alloy to join SiC, but its low melting point limits the using temperature of SiC joints. Therefore, it's necessary to develop new filler alloys with high melting points for the sake of improving using temperature of SiC joints. In this study, Ti-Ni brazing filler was used to join SiC ceramic, the results show that large amount of $Ti_2Ni$ intermetallic compounds exits in the brazing seam, which is harmful to mechanical properties of the joints. By adding 15% Zr, the amount of $Ti_2Ni$ reduced and eutectic phase generated in brazing seam, which is favorable for mechanical properties. The maximum shear strength of the joints brazed by Ti-Ni and Ti-Zr-Ni are 80 MPa and 110 MPa, respectively.

## Biography

Qin Qi is currently pursuing his PhD in Material Science and Engineering School, Harbin Institute of Technology, China. His research interest is the joining of ceramic/metal.

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