aluminium matrix, and moreover, the heat-treatment resulted in the formation of non-crystalline Al4C3 layer between fiber and pure aluminium matrix by energy dispersive X-ray spectroscopy in the TEM. New nucleation sites of aluminium carbide crystal occurred in this layer.

MMC-11: Evaluation of Design Strength and Residual Stress in Ceramic/Metal Joint
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Since the ceramic has excellent qualities in light weight, abrasion resistance and heat resistance etc, compared with the metal, it has been actively examined in order to apply for the structures such as gas turbine and turbo charger etc, which require high strength and heat resistance. But it is not desirable to be used for the structural material since the ceramic is fragile, so the join with the metal with abundant toughnees has been studied. However, during the cooling process, the joint residual stress develops on the ceramic/metal joint by the difference in thermal expansion coefficient between two materials and it affects the bending strength significantly. Also, in order to use the joint material as the structural material, the study about the fatigue of thermal cycle of actual use statement is necessary. Therefore, to ensure security and improvement of the bending strength of joint material, the state of residual stress distribution to the high temperature-thermal cycle, and studied the effects of thermal cycle and state of residual stress distribution on the strength of joint material as well.

MMC-12: Residual Stress on the Yielding Properties of SiC/Ti Plate
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Thermal residual stress (TRS) created in metal matrix composite influences the mechanical properties of the composites. In this paper, we present the TRS-modulated tensile properties of continuous SiC fiber reinforced titanium (SiC/Ti) composite. The magnitude and distribution of TRS inside SiC/Ti were evaluated by using firstly a simple 1-D beam model considering fiber-matrix structure and then a full 3-D FEM model. The warping of the SiC/Ti specimen resulted from the asymmetrical fiber placements was used as a measure to verify the pertinence of the mechanical models. A 3-D FEM simulation accounting all TRS information gives a good prediction of the composite tensile properties.

MMC(CMC)-13: The Effect of Pressure during Sintering on the Mechanical Properties of Hydroxyapatite
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Hydroxyapatite (HA) is known to be bioincompatible and osteoconductive, and be able to be synthesized chemically. The objective of the present study, the effect of pressure during sintering on the mechanical properties of HA. HA were sintered using hot press at a uniaxial pressure ranging from 7.81 to 62.5 MPa at a maximum temperature of 1200°C with a heating rate of 10°C/min. The density of the HA increased with increasing pressure and saturated at the pressure of 31.2 MPa. 4 points bending tests and fracture toughness measurement with IF method were conducted on the ceramics to clarify the effect of uniaxial pressure. Bending strength decreased at the pressure >31.2 MPa. This result indicates that residual stress generated during sintering process became larger with increasing pressure. Fracture toughness were also lower with high density HA.

Coffee Break