

Study On Stress Evolution In SiC Particles During Crack Propagation In Cast Hybrid Metal Matrix Composites Using Raman Spectroscopy

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ABSTRACT

The evolution of stress in the SiC particles during crack propagation under monotonic loading in a cast hybrid MMC was investigated by micro Raman spectroscopy. The experiment was carried out *in situ* in the Raman spectroscopy. Experimental results showed that cracks due to monotonic loading propagated by the debonding of the particle/matrix interface and particle fracture. Secondary cracks those formed in front of the main crack tip coalesced with the main crack in subsequent loading and final failure occurred. A high decrease in stress (several hundreds in MPa) was observed with the interfacial debonding at the interface and with the particle fracture on the particle. Moreover, the critical tensile stresses for particle–matrix interface debonding and particle fracture developed in hybrid MMC were also estimated during the crack propagation.

KEYWORDS: Cast metal matrix composites (cast MMCs); Crack propagation; Raman spectroscopy; Stress evolution

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