Application of square optical heating pulse model in measuring thermal diffusivity of SiC/B4C composites by using photoflash technique

ABSTRACT

This paper examines the application of a square pulse approximation to the camera flash temporal profile as a heating source in the photoflash technique. The technique was used in measuring SiC/B4C composites whereby thin-film polyvinylidene difluoride film was the detector. The analytical model derived for the square pulsed heating source was tested against the data obtained from SiC/B4C composites of different B4C composition. The suitability of the model is also compared with the model for Dirac-d function approximation to the camera flash. The square pulse model was found to fit reasonably well to the experimental data obtained from all the composites. The thermal diffusivity measured at room temperature was in the range of (10–35) £ 1026m2 s21.