E1-05: Creep deformation of glass ceramic composite materials

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Ceramic composite materials have received increasing attention during the last decade. Their improved toughness compared to the monolithic ceramics and high temperature capability have made them promising candidates for high temperature structural applications. However, the high temperature mechanical behaviour, particularly the creep deformation of ceramic composites, is poorly understood and experimental studies have received less attention compared to the studies of short term room temperature mechanical properties such as bend strength. Therefore, very little is currently known about the influence of composite microstructure on the creep behaviour.

This paper discusses the high temperature creep behaviour of a unidirectional silicon carbide fibre reinforced lithium aluminosilicate glass ceramic. Creep tests were conducted in an ambient-air atmosphere in the temperature range 950-1,200°C and in the stress range 70-200 MN m^{-2}. The activation energy for creep process is about 300 kJ mol^{-1} and the stress exponent is close to one. This indicates that a diffusion assisted mechanism is responsible for the creep deformation in this material.

Financial assistance by NARESA and Univ of Peradeniya Research Grants are acknowledged.