THE TEMPERATURE DEPENDENCE OF THE TRANSIENT CREEP OF Cd-2wt. % Sn ALLOY

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Transient creep characteristics of Cd-2wt.% Sn alloy have been investigated at temperatures between 383 and 448 K at constant stresses 11.89, 12.68 and 13.46 MPa. The results showed that there is one transition point at 413 K. From the transient creep described by the equation $\varepsilon_{tr} = \beta t^n$, the parameters β and n were calculated. The average value of the exponent n was found to be 0.445±0.023. The activation energy of transient creep in the vicinity of the transition region was found to be 13.4 and 19.4 KJ/mole below and above the transition point, respectively.

Introduction

It is well known that the phase transformation process can contribute to the weakening of a material when tested under tensile conditions [1]. Interest in this field has grown in recent years [1,5] and the results obtained indicated that the strain increases extensively during phase transformation.

Elevated temperature creep studies [1,4-7] explained the dependence of strain and strain rate on the applied stress, the test temperatute and the state of tested sample. The transient creep can be represented by Friedel equation [8];

$$\varepsilon_{tr} = \beta t^n \tag{1}$$

where ε_{tr} and t are transient creep strain and creep time, respectively. β, and n are the transient creep parameters which are calculated from the intercept and the slope of the ln ε_{tr} and ln t relation, respectively.