

An Influence of Cold Work on Creep of Engineering Materials

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An influence of prior tensile plastic deformation on the basic creep parameters such as minimum creep rate, time to rupture, duration of creep stages and elongation is studied for copper and aluminium alloy. The materials were tested at two different temperatures, copper at 523 K and 573 K, aluminium alloy at 423 K and 473 K. It is shown for both materials that the minimum creep rate, and elongation decreases as the amount of the plastic prestrain increases. However, this relation was proportional to the plastic predeformation only up to 5% in the case of copper, and up to 6% for aluminium alloy. For copper, a little increase of time to rupture with the increase of plastic predeformation has been observed for specimens tested at higher temperature (573 K) in comparison to the nonprestrained material. In the case of lower temperature (523 K) the lifetime decreases significantly with the increase of plastic predeformation. The creep data for aluminium alloy exhibit the same tendency of lifetime variation due to prestraining programme in both temperatures under the question, namely, an extension of lifetime proportional to the magnitude of plastic prestrain. It has to be noted however, that plastic prestrain magnitudes greater than 6% led to the opposite effect, i.e. lifetime reduction.

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