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Influence of pre-stretching on the subsequent creep aging behavior of aluminum alloy 2524

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ABSTRACT

In order to improve the mechanical properties of the materials, the thermo-mechanics treatment has become a hot area of research in material processing. The effect of the pre-stretching on the creep aging response have been analyzed for AA2524 using constant-stress creep aging test, transmission electron microscope (TEM), and mechanical property test. The results show that the creep strain and creep strain rate are increased. Meanwhile, the yield strength is enhanced, and the time to reach the peak strength is shortened with increasing amount of the pre-stretching. TEM observations find that the precipitates are more dispersive and smaller in pre-stretched samples than that in un-stretched samples. In addition, pre-stretching before the creep aging process can control the precipitation orientation effect in AA2524, as well as raising the mechanical properties. Thus, it can be concluded that the pre-stretching can increased evidently improve the formability, microstructures, and mechanical properties of AA2524 in creep-age forming process.

KEYWORDS: creep-age forming process, pre-stretching, 2524 aluminum alloy, formability, microstructures, mechanical properties