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PREDICTION OF TENSILE DEFORMATION BEHAVIOR OF AL-LI ALLOY 2060-T8 BY COMPUTATIONAL HOMOGENIZATION-BASED CRYSTAL PLASTICITY FINITE ELEMENT METHOD

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In current study, computational homogenization-based crystal plasticity (CP) modelling was presented to determine the deformation behavior of a novel third-generation AL-Li alloy 2060-T8 at room temperature, strain rate of $0.01s^{-1}$ and various loading directions. The computational homogenization strategy used a representative volume element (RVE) which describes the real microstructure of AA2060-T8 sheet to consider the in grains deformation behaviour. Besides, a periodically boundary condition was modified to consider both deformation induced anisotropy and the geometrical anisotropy. The initial microstructures and micro-textures of the AA2060-T8 sheet were determined by EBSD measurements, as well as used to build up the RVE model. The material parameters used in CP modelling was determined from the stress-strain curve obtained from the tensile test at strain rate of $0.001s^{-1}$ and loading direction of 30° with reference to rolling direction. The results obtained from computational homogenisation strategy keep a remarkable agreement with the results determined from experimentation. In conclusion, the computational homogenization based CPFEM is able to predict the deformation behavior and capture the anisotropic response of AA2060-T8 sheet at various deformation conditions.

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