entation in α is large in the IBL and near the shear band in the CLS. As rolling reduction increases, the proportion of FL increases. By annealing at 973K after heavy cold rolling, the $(\alpha+\theta)$ microduplex structure with α and θ grain sizes less than 0.5 μm is formed. This structure consists of a coarse grain region (d_α~0.4 μm) containing high-angle α boundaries and a fine grain region (d_α~0.2 μm) with low-angle α boundaries by inheriting local orientation distribution in the deformed α structure. The coarse grain region is formed at the deformed region where local misorientation in α is large essentially by recovery under pinning by θ particles. As the annealing is prolonged, the fraction of the coarse grain region increases. The cold-rolled and annealed pearlite exhibits a wide range of strength-ductility balance.

(cf. *ISIJ Int.*, **45** (2005), 392)

Mechanical Properties

Effect of microstructure on strain-hardening behaviour of a Ti-IF steel grade

P.ANTOINE et al.

Thermomechanical processing parameters were adjusted during the processing of Ti-IF steel sheet to obtain microstructures with different grain sizes and precipitation states. The grain size and precipitation state were fully characterized for each specimen in order to investigate the effect of each on mechanical properties. Uniaxial tensile tests were performed at a strain rate of $2 \cdot 10^{-3} s^{-1}$ at room temperature. Relationships between strain-hardening coefficient, n, and mechanical properties were analysed. Differences in measured n-values between the different specimens are associated to a change in yield strength resulting from hardening effects of precipitates and grain size at the beginning of plastic deformation. The role of grain size and precipitation state on strain-hardening behaviour is discussed in terms of their effect on dislocation structure evolution. A strain transition exists where dislocation tangles evolve towards well-defined dislocation cells. It is shown in the present study that the entangled dislocation density is very sensitive to the microstructure for the Ti-IF steel studied while the dislocation cell size appears to be insensitive to the microstructure.

(cf. *ISIJ Int.*, **45** (2005), 399)

Effect of zirconium and lanthanides on the recovery in 2618 base aluminum alloys

N.JAUKOVIC et al.

Influence of zirconium and lanthanides on structure and properties of 2618 base aluminum alloys, used at elevated temperatures, are presented in this work. The recovery was determined through the change in the microhardness with time and temperature on different zirconium and lanthanides contents. It was used for evaluation of creep-resistance of the alloys. It is possible to predict the optimal chemical composition of alloy to provide good mechanical properties at elevated temperatures.

Zirconium exhibited to retard the recovery at lower temperature, 150–250°C, whereas lanthanides do higher temperature 300–350°C.

(cf. *ISIJ Int.*, **45** (2005), 405)