1.5.5.2.4 Deformation

The atomic environment can also be varied by plastic deformation. The effect of slip on the fracture properties has been investigated in Cu_2MnAl. Slip readily occurs along <111>. However, if it occurs along <110> a sharp decrease in ductility takes place around 240 K, and below this temperature fracture occurs explosively with practically no plastic deformation. If slip occurs along the (112) planes, crystals can be deformed plastically even at 77 K.

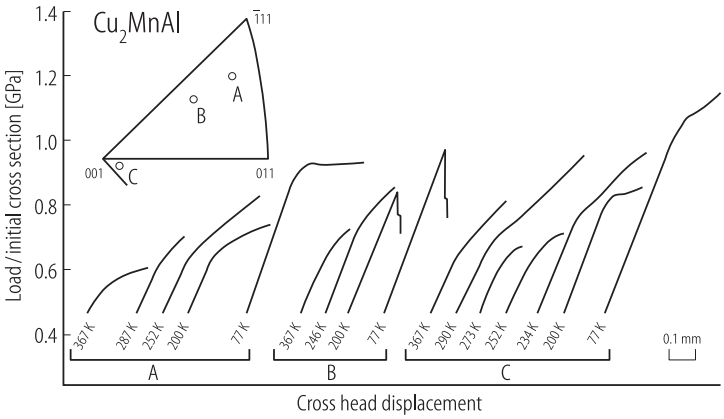

Fig. 45. Stress-strain curves for three different orientations of Cu_2MnAl single crystals at 77…367 K [84U1].

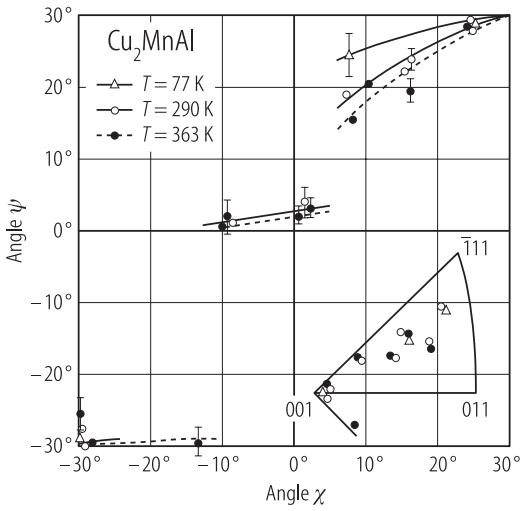

Fig. 46. Orientation dependence of the observed slip plane at 77, 290 and 363 K in Cu_2MnAl [84U1]. χ: angle between {111} zone and $(\bar{1}\,01)$; ψ: angle between the observed slip plane and $(\bar{1}\,01)$.

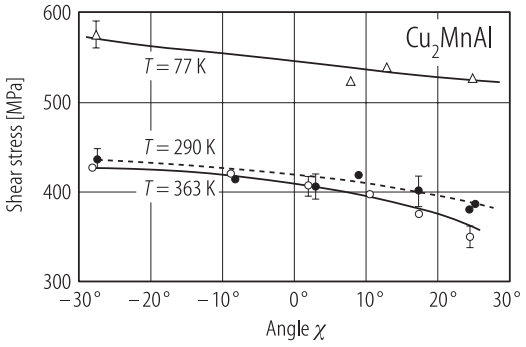

Fig. 47. Orientation dependence of the critical resolved sheer stress in Cu_2MnAl at 77, 290 and 363 K [84U1]. χ: angle between {111} zone and $(\bar{1}\,01)$.

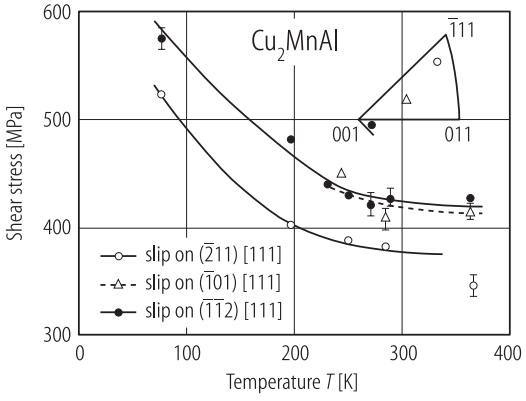

Fig. 48. Temperature dependence of critical resolved shear stress in Cu_2MnAl for $(\bar{2}\,11)$ [111], $(\bar{1}\,01)$ [111] and $(\bar{1}\,\bar{1}\,1)$ [111] slip system [84U1].