

Coupling between precipitation and plasticity in a precipitation hardening Aluminium alloy

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Precipitation is well known to be strongly affected by the presence of structural defects, and notably by the dislocations caused by plastic deformation. However the direct coupling between the movement of dislocations and the evolution of precipitates has not been the subject of much systematic research. We will report an experimental study of this coupling, using time-resolved Small-Angle X-ray Scattering under thermo-mechanical conditions. The evolution of precipitate size and number density when the material is subjected to straining at moderate temperatures will be shown to be significantly more rapid as compared to simple thermal ageing. Interpretation of these results in terms of physical mechanisms of interaction between precipitates and moving dislocations will be made.