

Precipitation kinetics and mechanical behavior in a solution treated and aged dual phase stainless steel

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Abstract: The precipitation kinetics and the mechanical behaviour in a solution treated and aged dual phase stainless steel (DSS) are investigated. X-Ray diffraction, transmission and scanning electron microscopy techniques are used to characterize the microstructure and to identify its constituents. The precipitation kinetics analysis shows that the ferrite to γ phase transformation follows the modified Johnson Mehl Avrami (JMA) model containing an impingement parameter c that is adjusted to 0.3. Activation energies calculation leads to conclude that interface reaction is the main mechanism that controls the γ phase formation. Detailed analysis of the extent of the different tensile deformation domains reveals the significant contribution of both γ phase particles and dislocation accumulation to the strain hardening of the material

Keywords : alloys, aging, microstructure, mechanical properties