

Neutron diffraction analysis of austenite transformation kinetics in Mn-Si TRIP steel

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Abstract

High strength and ductility of the TRIP steels is attributed to the transformation induced plasticity effect resulting from the strain induced martensitic transformation of the retained austenite in the ferrite/bainite microstructure. The present work reports results of in-situ neutron diffraction experiments focused on monitoring the phase evolution in TRIP steel samples subjected to tensile loading at room temperature. Comparison of the single line profile analysis of reactor data (TKSN-400 at NPI Rez) and multi line profile analysis of data obtained at spallation neutron source (ENGIN-X at ISIS RAL Chilton) suggests that the former can be used in the first approximation for in-situ monitoring of the phase evolution in TRIP steels subjected to mechanical loads.