

The aim of the present study is to evaluate the impact of heating rate on the microstructure and tensile properties of cold-rolled low and medium carbon steels. For this purpose, cold-rolled low and medium carbon steels were subjected to short peak-annealing experiments at 900 and 1100 °C under three heating rates (10, 450 and 1500 °C/s). The microstructure reveals a mixture of phases and microconstituents (ferrite, bainite, and as-quenched martensite) which are related to the carbon heterogeneities in austenite. The microstructural characterization suggests that the grain refinement achieved after ultrafast heating has a minor effect on the yield and ultimate tensile strength, compared to the relative microstructural distribution. It is suggested that the interplay of various strengthening mechanisms in samples subjected to ultrafast heating rates are responsible for the observed increase in strength and ductility.