

Kinetics of short-range ordering in γ -Cu-Al alloys

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The ordering behaviour in quenched γ -Cu-Al was investigated by differential scanning calorimetry (DSC) under rising temperature conditions and by electron diffraction. It was found that the ordering processes can be better explained in terms of a homogeneous short-range order (SRO) model rather than a heterogeneous disperse order (DO) model as previously interpreted for the same type of experiments. The DSC traces indicate that the ordering takes place in two stages: the stage 1 ordering at lower temperatures is associated with the migration of excess vacancies and the stage 2 ordering at higher temperatures is associated with the migration of equilibrium vacancies. At higher temperatures, a marked surge of energy absorption occurs (stage 3) which is attributed to the destruction of order. For furnace-cooled alloys, only stage 3 appears. The relative dominance of stages 1 and 2 is influenced by the quenching temperature, the quench rate, the density of vacancy sinks and the sample shape