

LEEM Observation of Dynamic Phase Transformation in Steel

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It has been reported that the materials with ultra-fine grains show outstanding high strength, high speed superplastic deformation and high corrosion resistance. A lot of trials have been attempted to produce and keep ultra-fine grains, e.g. ultra-fine straining process, dissolution of specific precipitates, high temperature annealing, etc.

It has become important to make the mechanism clear in order to fabricate a high performance steel. So far we have, however, never known how we can evaluate the effects of precipitates and many kinds of processes. In this study we tried to evaluate the effects derived from the precipitates by using LEEM technique. It is proved that LEEM is great useful technique to observe high speed phenomena in steel. To use low energy ion sputtering and low temperature annealing, A LEEM-LEED can be monitored clearly on the polycrystalline steel surface. We succeeded to observe grain growth, α - γ phase transformation, and pinning effect.