

2022 SEAISI Steel Mega Event & Expo

**The Influence of Annealing Parameters
on Microstructures
in Low Carbon Steels**

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OUTLINE

□ Introduction

□ Experiment

□ Results and Discussion

□ Conclusions

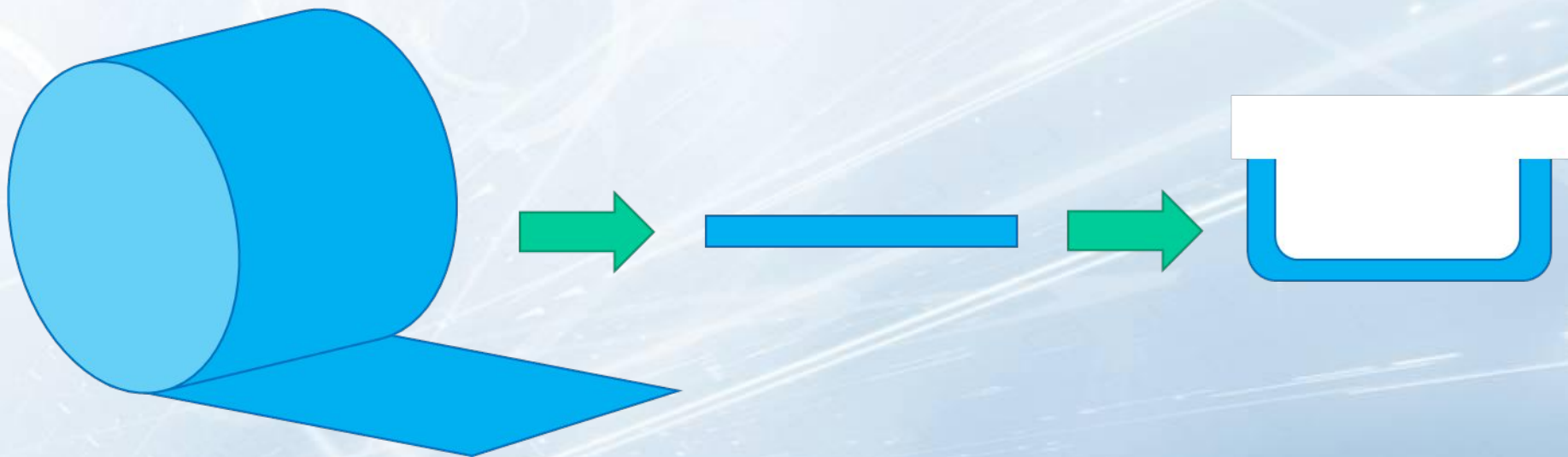


An illustration of two hands, one at the top and one at the bottom, holding a large white scroll. The hands are rendered in a simple, stylized manner with orange and tan colors. The scroll is unrolled, and the text '1. Introduction' is written in the center in a bold, red font. The background is a light blue gradient with faint white lines.

1. Introduction

Introduction

- Hot-rolled band product for hub of wheel
- Formability
- Conduction of annealing treatment



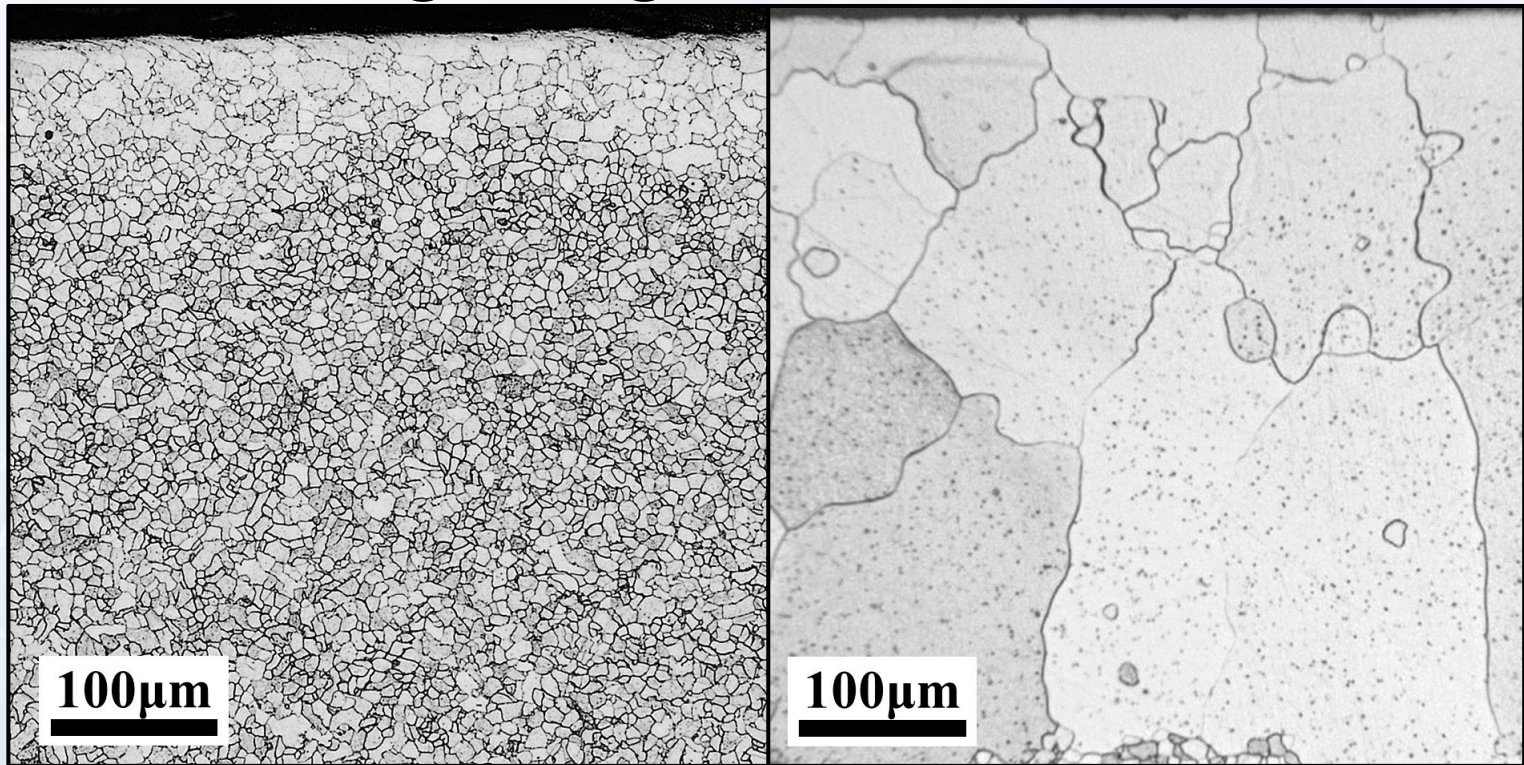
Introduction

- SAE 1010, Fe-0.1C-0.45Mn (wt%)
- Annealing treatment was conducted
 - not enough too hard
 - decent spheroidized structures
 - over abnormal grain growth



Introduction

- Abnormal grain growth

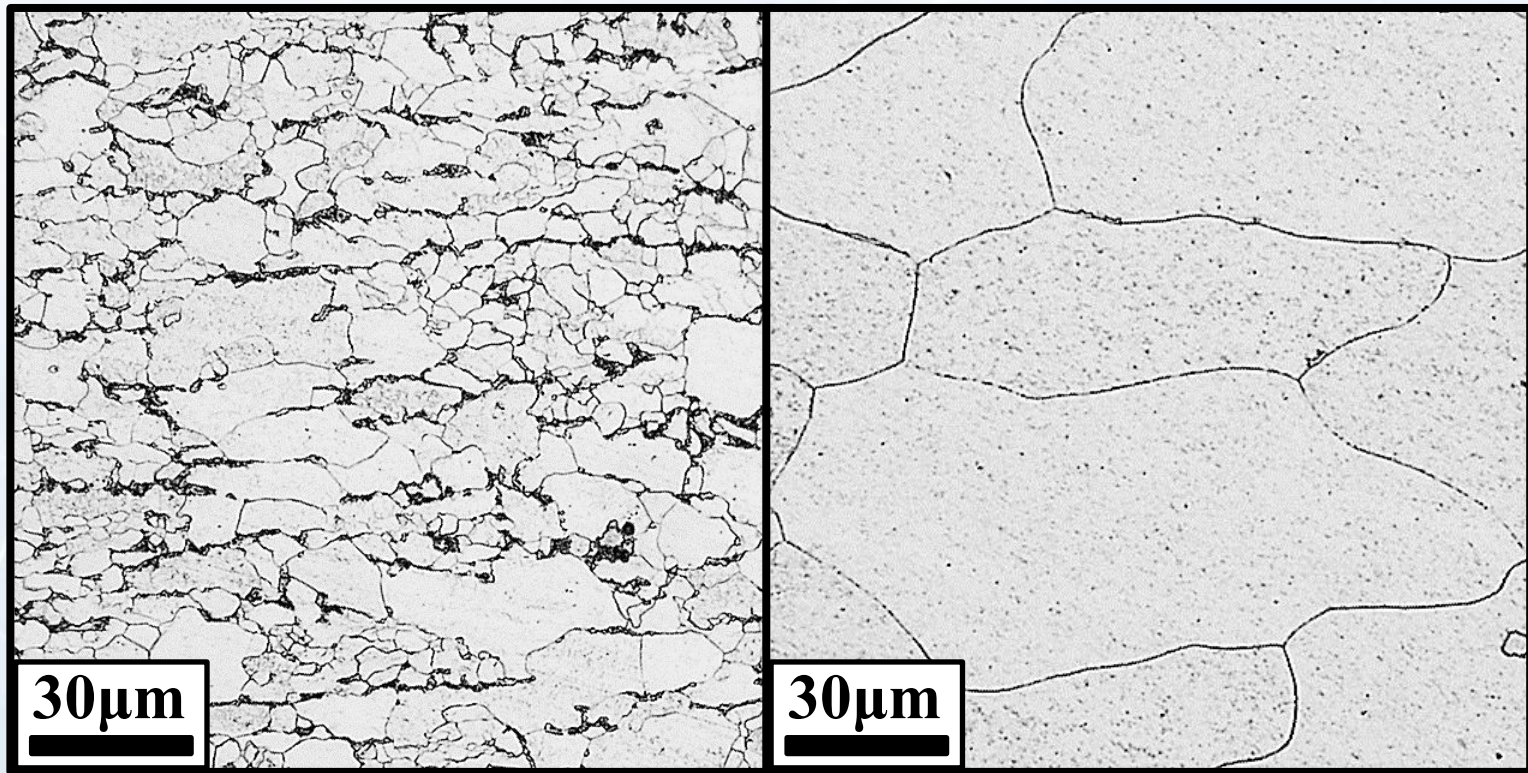


Normal

Abnormal

Introduction

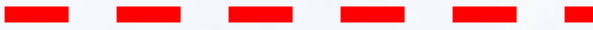
- The microstructures near the surface



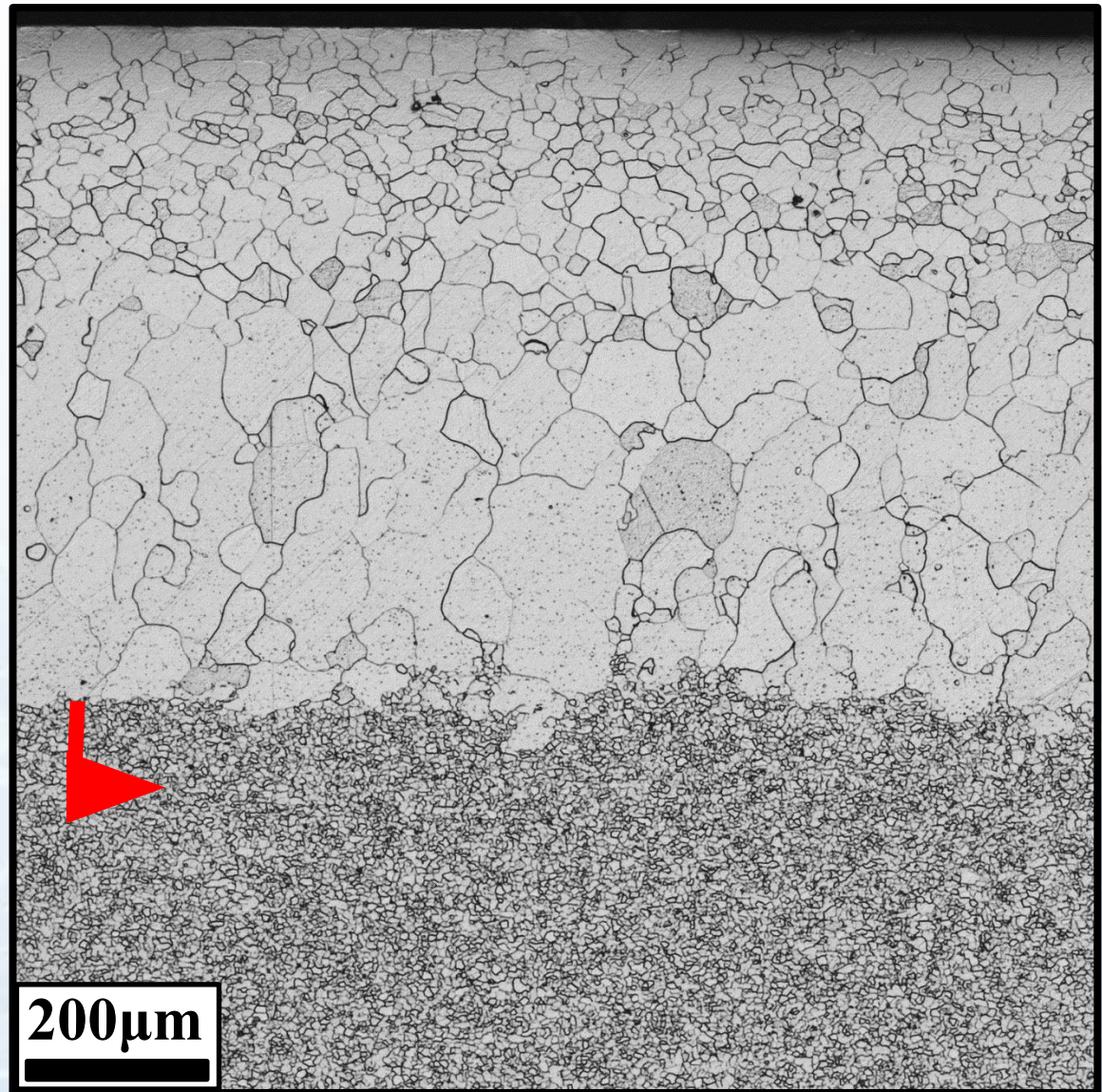
Hot-rolled band

After annealing treatment

Big grains competed
with one another



Big grains grew along
the thickness direction

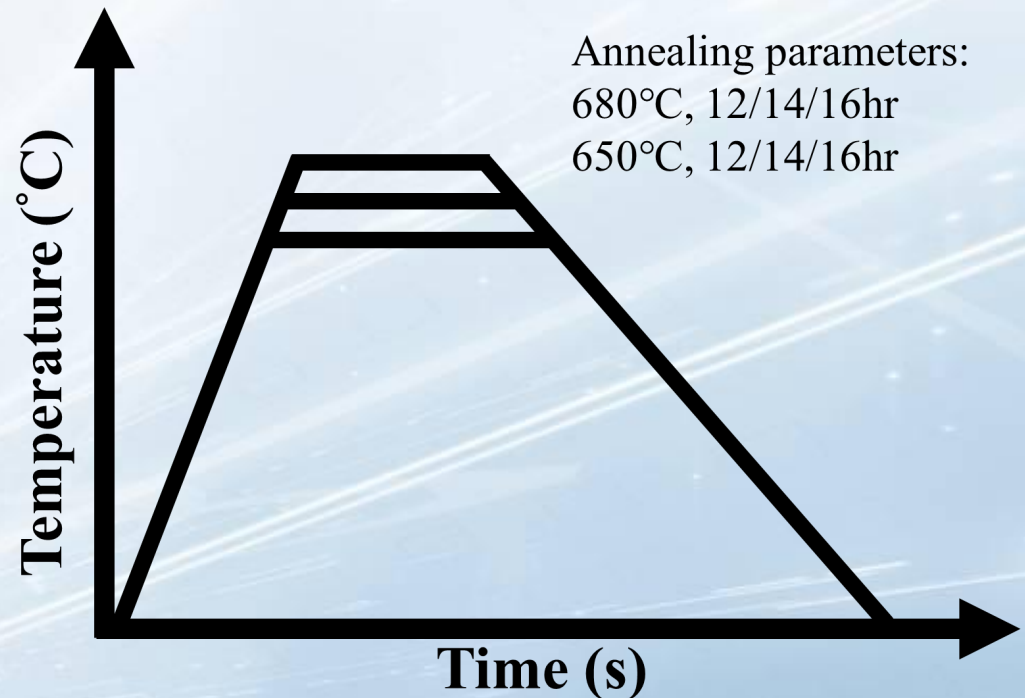


An illustration of two hands, one at the top and one at the bottom, holding a large white scroll. A blue ribbon is draped across the scroll, starting from the left edge and extending towards the center. The background is a light blue gradient with faint white lines.

2. Experiment

Experiment

- Goal: spheroidized structures without abnormal grain growth
- OM & SEM observation
- Hardness

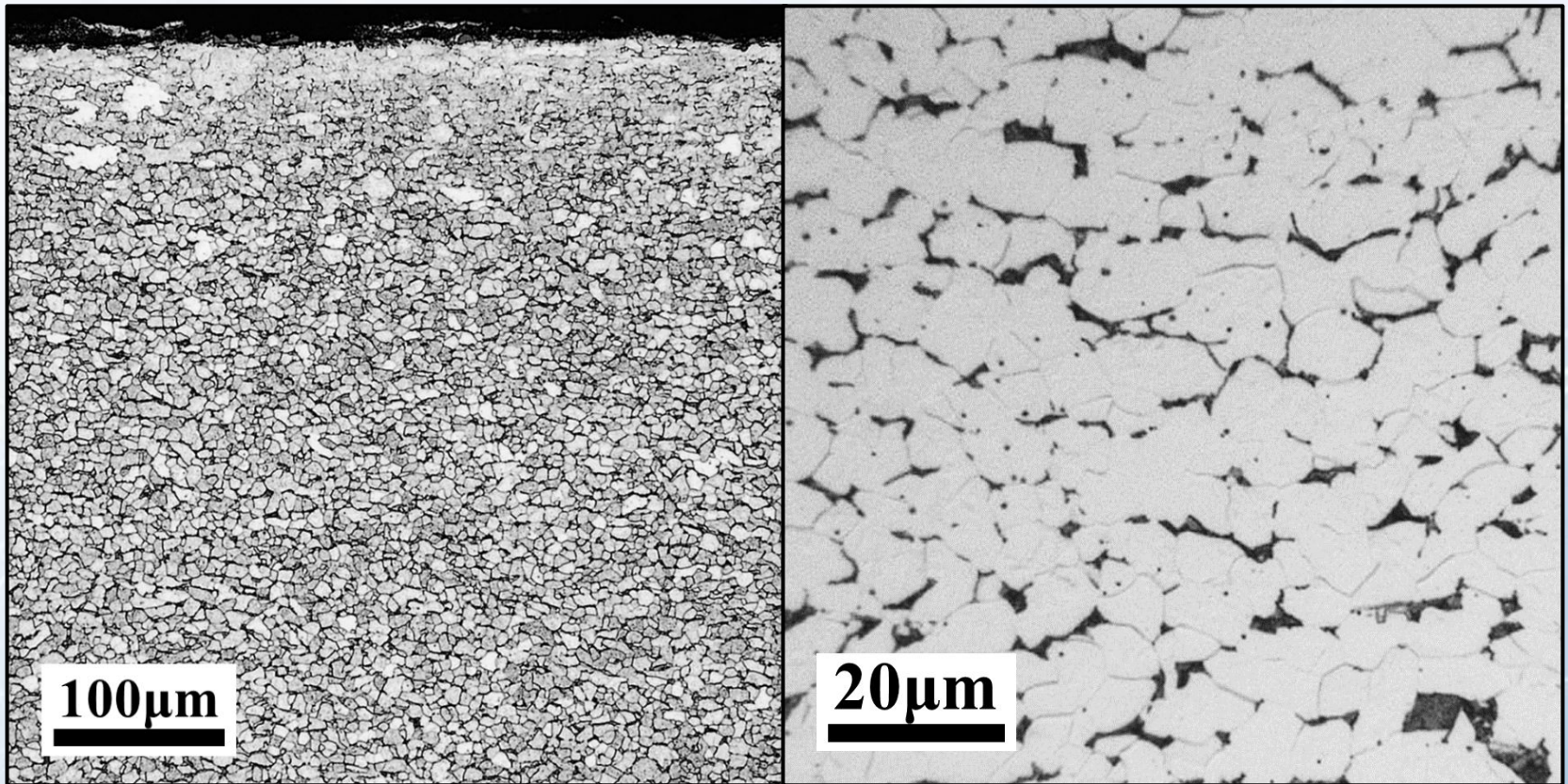




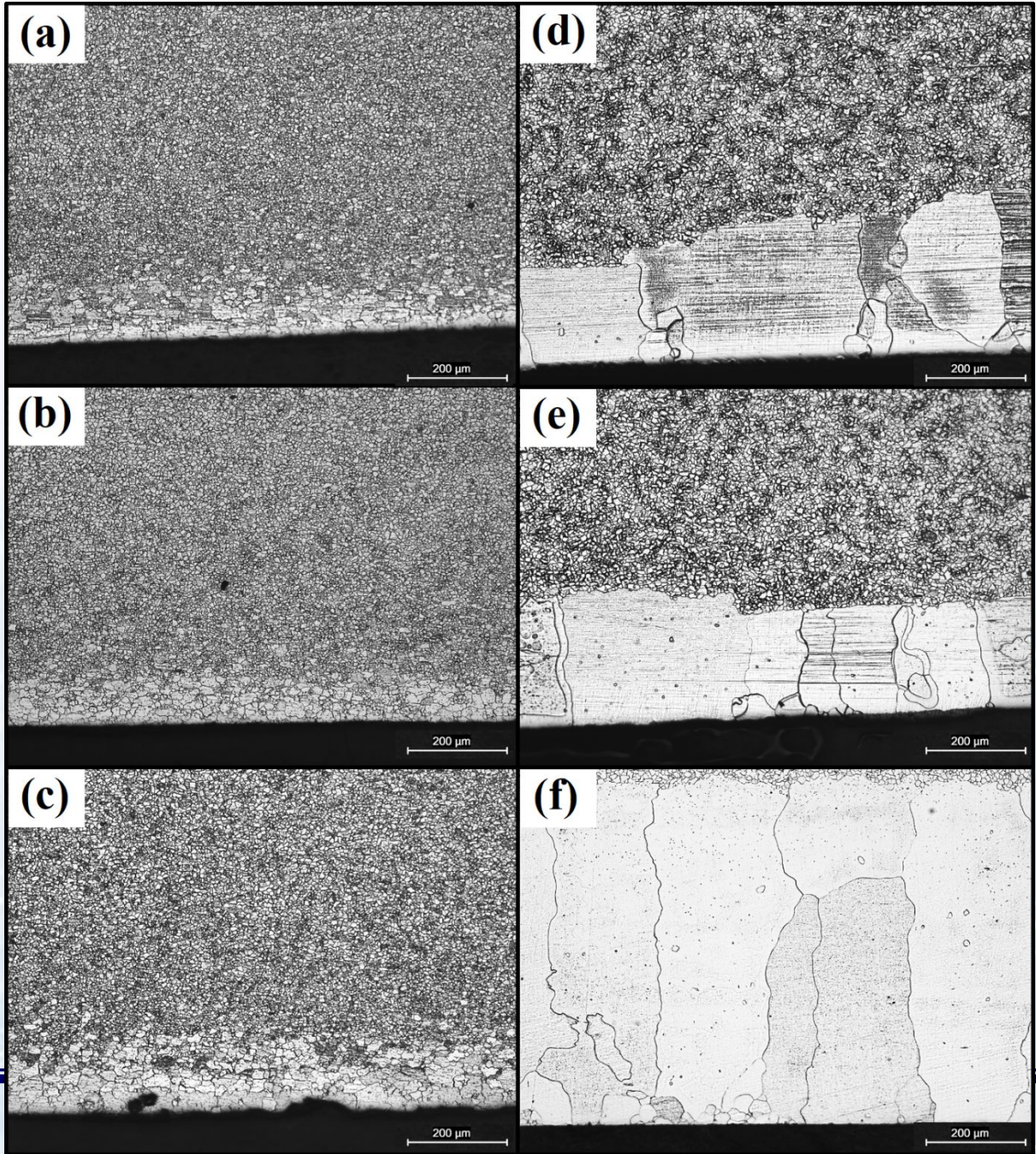
3. Result and Discussion

Result and Discussion

- Microstructures of hot-rolled bands

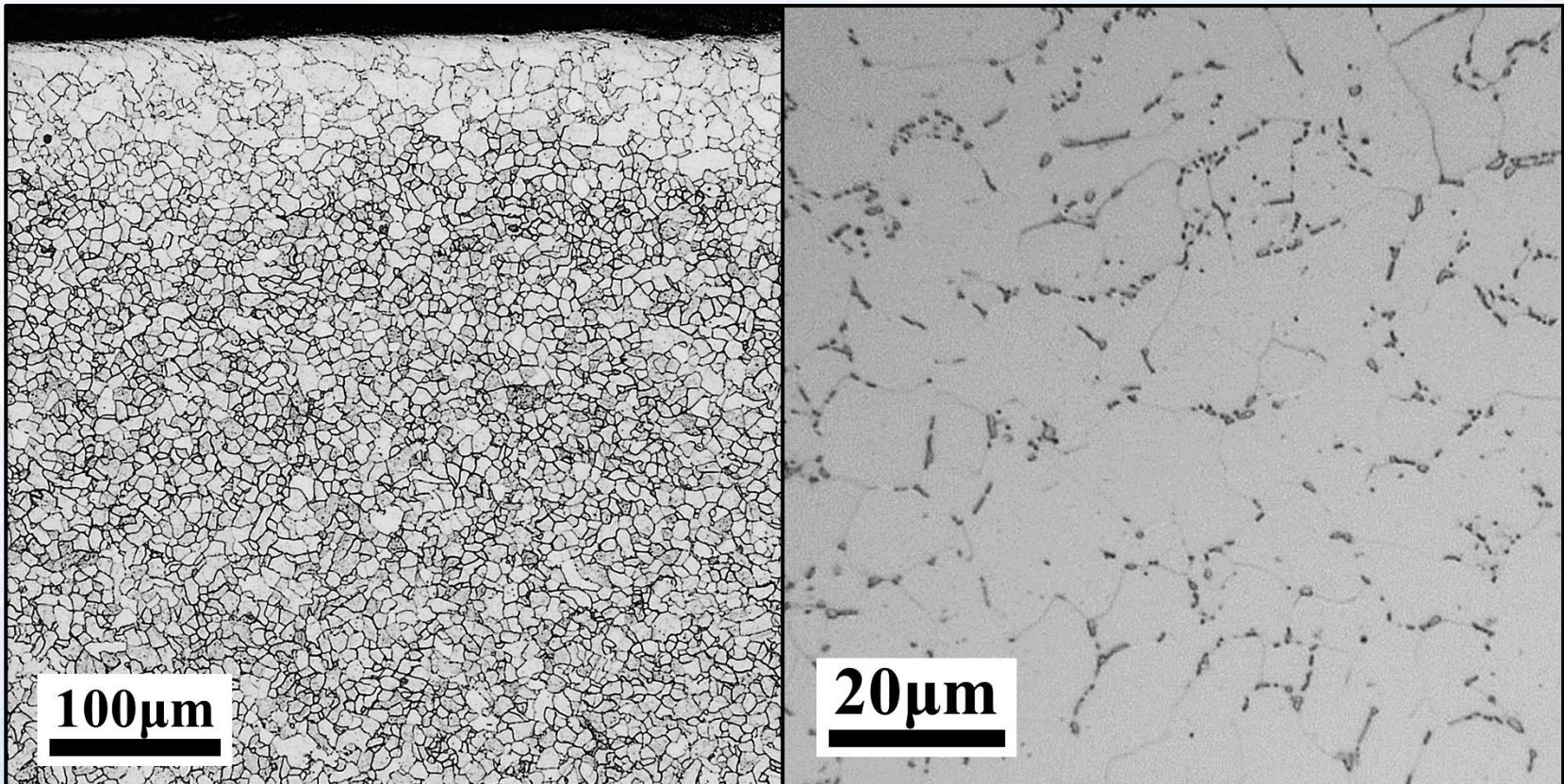


650°C 12hr	680°C 12hr
650°C 14hr	680°C 14hr
650°C 16hr	680°C 16hr



Result and Discussion

- New annealing parameters



An illustration of two hands, one at the top and one at the bottom, holding a large white scroll. A blue ribbon is draped across the scroll, starting from the left edge and extending towards the right. The background is a light blue gradient with faint white lines.

4. Conclusions

Conclusions

- Annealing treatment could soften materials, but the abnormal grain growth sometimes occurred at high temperature.
- After several annealing experiment, the annealing treatment with $650^{\circ}\text{C}/12\text{hr}$ was chosen.



Thank You

