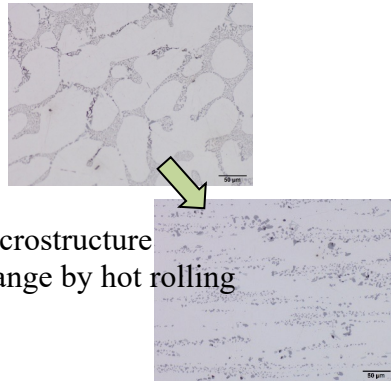


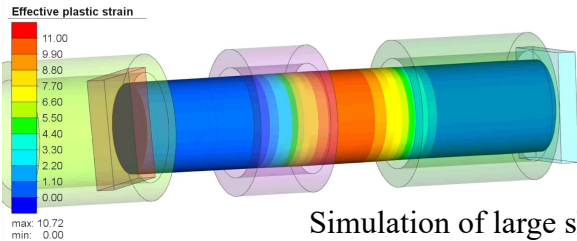
Improvement of microstructure and mechanical property of Aluminum alloys applied by plastic deformation

Associate Professor Yuji KUME

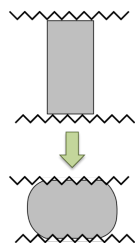
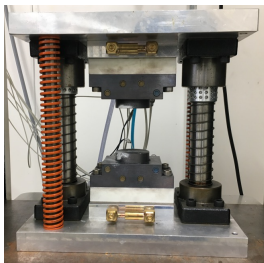
Illustration



Microstructure change by hot rolling



Simulation of large shear torsion straining
And optimization of process conditions



Determining of flow stress equations' parameters by upset test

$$\sigma_F = C_1 \cdot e^{C_2 \cdot T} \cdot \epsilon^{n_1 \cdot T + n_2} \cdot e^{\frac{I_1 \cdot T + I_2}{\Phi}} \cdot \dot{\epsilon}^{m_1 \cdot T + m_2}$$

Content :

Metals do not show its full mechanical properties if we use "as-cast condition " or "as heat-treated condition" without any intents. The important things are how to make them.

In our laboratory, we focus on the plastic deformation processes to make the metals. We has 3 related projects.

1. Processing hot rolling on as-cast aluminum alloys and studying the relation between rolling ratios and mechanical properties or microstructural changes.
2. FEM simulations of continuous torsion straining process on high strength aluminum alloys and optimization of its conditions.
3. Measuring of the materials parameters for FEM simulation by compression test.

Appealing point :

- We are good at FEM simulation for plastic deformation.
- We contribute to the local community through industry-academia collaboration.

Yamagata University, Faculty of Engineering
Research Interest : plastic deformation ,
microstructure control, porous metals.

E-mail : kume@yz.yamagata-u.ac.jp
Tel : +81-23-26-3232

HP : <https://kume-lab.yz.yamagata-u.ac.jp>

