Control of Materials Function and Morphology Subarea (Utsunomiya Laboratory), Intelligent Materials Processing Area, Division of Materials and Manufacturing Science

Research

This laboratory is developing novel processes for new materials such as eco-materials, high-strength materials, materials with formability. The evolutions of microstructure, texture and properties during the processes are investigated academically. Tribology in the process is also studied.

Staff members

Hiroshi UTSUNOMIYA, Professor
Phone: +81-6-6879-7503
E-mail: uts@mat.eng.osaka-u.ac.jp

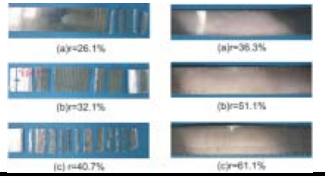
Ryo MATSUMOTO, Associate Professor
Phone: +81-6-6879-7500
E-mail: ryo@mat.eng.osaka-u.ac.jp

Jyoji MIYAMOTO, Technical Officer
Phone: +81-6-6879-7502
E-mail: miyamo@mat.eng.osaka-u.ac.jp

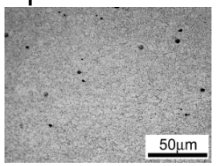
1. High-Performance Mg Alloy Sheets

High-speed rolling is effective to produce Mg alloy sheets without fracture. The rolled sheets show fine-grained microstructure and well-balanced mechanical properties.

Improvement in deformability (left: conventional, right: proposed)



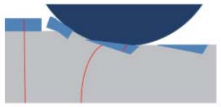
Microstructure of rolled Mg sheet

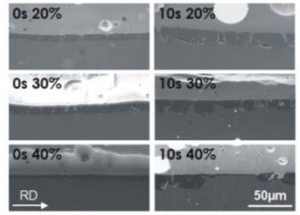


2. Tribology in Metal Forming Processes

Behavior of surface oxide film (scale) and its influence on friction, forming characteristics are studied.

Deformation model of scale during rolling





Scale on steel sheet just after hot rolling

3. Development of New Forming Processes

New forming processes for improvement of forming limit and microstructure control are proposed on servomotor press.

New forming process for forming of deep hole using servo press