柳本研究室
Yanagimoto Laboratory

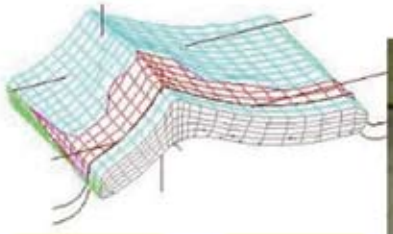
形状の創製と機能の創出
Simultaneous Generation of Geometry and Microstructure

高次機能加工学は、形状の創成と機能の創出を同時に実現することを狙いとする加工技術で、機械（製造技術）と材料技術の境界に位置しています。本研究室では、変形加工理論解析・変形加工システムの開発・材料組織制御などの基礎研究に取り組んでいます。

Hyper-functional forming, which locates at interdisciplinary field between production technology and materials technology, is aimed at generating geometry and mechanical properties of formed product. We are carrying out investigations into the basic field of hyper-functional forming as theoretical analysis of metal forming, development of new forming systems and micro-structure control of metallic materials by forming.

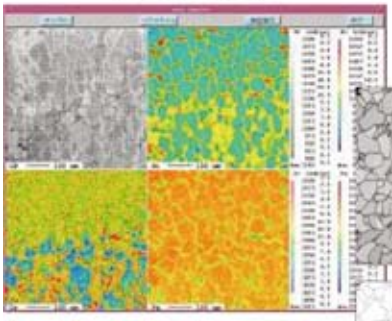
高次機能加工学 Hyper-functional Forming

- **塑性加工 CAE システム**
  CAE system for forming
- **高速圧縮材料試験とデジタルフォーミングプラットフォーム**
  High-speed compression test and digital forming platform
- **半溶融・半凝固成形と組織制御**
  Semi-solid forming and microstructure control
- **超軽量構造実現のための温間および熱間プレス成形**
  Warm and hot forming of steel sheets for ultra lightweight construction
- **チタン合金、マグネシウム合金等高合金材の成形加工**
  Forming of high alloys such as Titanium alloys and Magnesium alloys

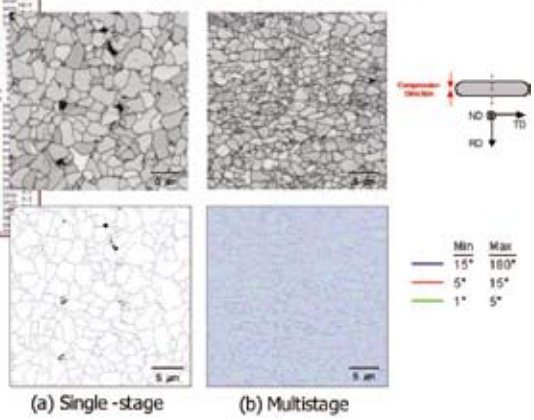


圧延加工CAEシステム
CAE system for rolling

高ひずみ速度付与試験設備
High-speed compression testing machine



ステンレス鋼の半溶融・半凝固加工
Semi-solid forming of type 304 stainless steel
The concentration profile of the two-phase semi-solid state of type 304 stainless steel is obtained by EPMA . The liquid and solid parts are clearly shown as regions with different concentrations of Ni and Cr.



単パスおよび多パス加工による細粒鋼の創製
Ferrite grains using image quality maps (upper) and grain misorientation maps (lower) obtained by EBSP analysis

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