Requests for Collaboration

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**Research Interests**

- Severe plastic deformation of a bulk material by ECAP processing
- Microstructural analysis on fatigued metallic materials
- Fabrication of multilayered structure by electrodeposition

**Creative Achievements in The Application of New and Existing Science and Technology**

**(1)** Very high strength has been achieved in austenitic stainless steel that is severely deformed by equal channel angular pressing (ECAP) technique. When the ECAP processing is conducted at a die temperature of 423K, a lot of deformation twins having an average twin width of 50 nm is introduced. The ultimate tensile strength of the 316L-type stainless steel processed for 4-pass ECAP exceeds 1.5GPa.
**(2)** Fatigue properties has been investigated particularly in single- and bi-crystals samples, to explorer microscopic aspects of fatigue phenomena. Dislocation structures and lattice rotations of the fatigued samples can be estimated by the electron channeling contrast imaging (ECCI) and the electron backscatter diffraction (EBSD) techniques.
**(3)** Multilayered structures have been fabricated by a special electrodeposition technique. By applying a rectangle electrochemical potential wave form is applied in a solution containing two metallic ions, we can fabricate alternate stacks of two metallic layers. In a novel method using a periodic potential wave that changes continuously, a multilayered film with a high composition gradient can be produced. This composition-gradient alloy film revealed excellent strength in comparison with a conventional multilayered film.

**Technology (Product, Process, Device, Service etc.) That I Want to Request for Collaboration**

- Application in industry including automobile, medicine, etc.
- In situ deformation observation in electron microscopes.
- Theoretical modeling and simulation of strengthening in nanostructured materials.

**A List of 5 Key Publications**


- Controlling strength and ductility: Dislocation-based model of necking instability and its verification for ultrafine grain 316L steel, A. Vinogradov, I.S. Yasnikov, H. Matsuyama, M. Uchida, Y. Kaneko, Y. Estrin, ***Acta Materialia***, **106**, 295-303, (2016).
- Cyclic Response of SUS316L Stainless Steel Processed by ECAP, Y. Kaneko, S. Hayashi and A. Vinogradov, ***Mater.Trans.***, **54**, 1612-1618 (2013).
- Enhanced fatigue properties of nanostructured austenitic SUS 316L stainless steel, H. Ueno, K. Kakihata, Y. Kaneko, S. Hashimoto and A. Vinogradov, ***Acta Mater.***, **59**, pp.7060-7069 (2011).
- Y. Kaneko, H. Sakakibara and S. Hashimoto, "Microstructure and Vickers hardness of Co/Cu multilayers fabricated by electrodeposition", ***J.Mater.Sci.***, **43**, 3931-3937 (2008).
- Fatigue Crack Propagation in Copper Bicrystals Having the Grain Boudaries of Σ3 Vicinal Domain, Y. Kaneko, K. Kitagawa and S. Hashimoto, ***Interface Sci.***, **7**, 147-158 (1999).