Innovative Materials and Processing for Symbiosis with Global Environment

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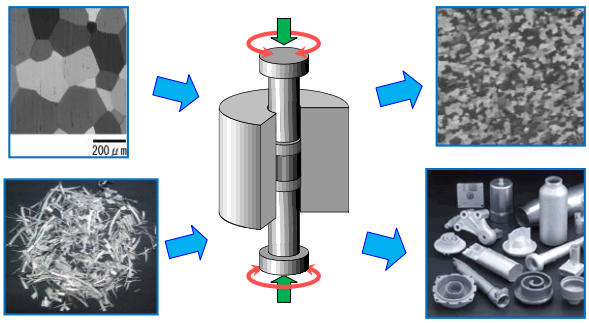
Innovation of Metals by Compressive Torsion Processing

The “Compressive Torsion Process” is an unique severe deformation process and originally developed in our laboratory.
This process is applicable to various innovation of metals, those are improvement of performance of metals by refinement of Grain and Precipitate, direct and dense consolidation of metallic and mixed powder, and solid phase recycling of machined chip wastes.

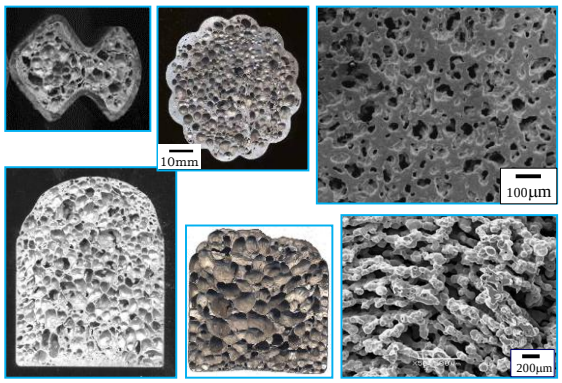
Innovation with microstructure refinement



Solid phase recycling of machined chip waste

Development of Porous Metals and Compounds

Porous and cellular metals have attractive structural and functional properties due to their unique cell morphology. Their porosity and cell morphology are important factors to control some physical and mechanical properties.
We are working on different kinds of porous processing, one is a foaming process by heating precursors including blowing agent, and another is a combustion synthesis for producing intermetallics foam and porous ceramics.



Development of Metal and Ceramic Matrix Composites

The “reactive infiltration process” was developed to produce metal-ceramic or ceramic-ceramic composites by utilizing reaction heat as an manufacturing energy.
This process is combined a plessureless infiltration process and an in-situ synthesis of inorganic reinforcement or matrix. In this process reaction heat is used to produce the composites.