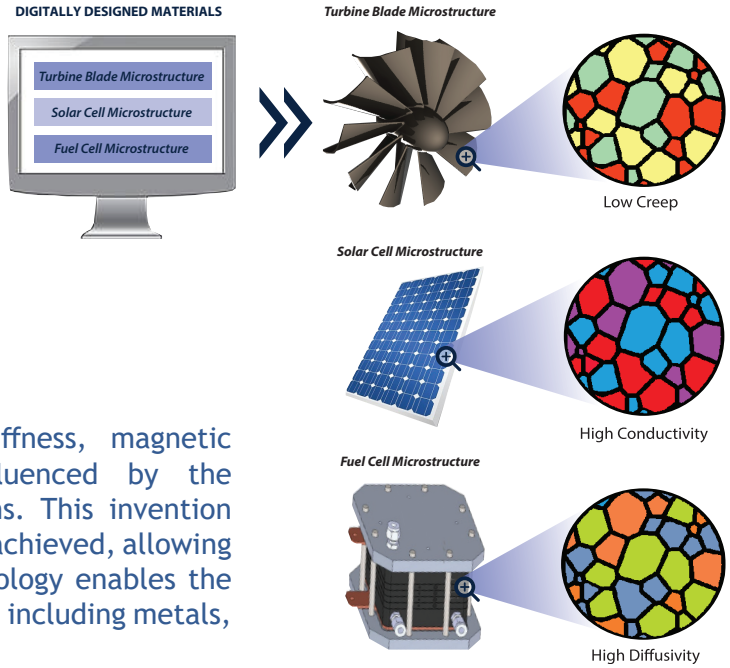
Controlling the Structure of Crystalline Materials

BYU #2016-038

DESCRIPTION

Researchers at BYU developed a new manufacturing process that makes it possible to control the structure of crystalline materials in an unprecedented way. The invention has been inspired by a desire to generate tools and methods to manufacture materials that are designed digitally, thus minimizing the gap between computational design and production.



PROBLEM SOLVED

The properties of a material (e.g. strength, stiffness, magnetic susceptibility, diffusivity, etc.) are strongly influenced by the crystallographic orientation of the constituent grains. This invention enables target distributions of grain orientations to be achieved, allowing for the fabrication of designer materials. This technology enables the tailoring of the properties of a broad range of materials including metals, ceramics and all polycrystalline materials.

KEY ADVANTAGES

- ***Unprecedented control of crystallographic texture***
- ***Defect control (especially of grain boundary types)***
- ***The ability to optimize material structure for engineered applications***

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APPLICATIONS

Any application for which the control of crystallographic texture in polycrystalline materials is desired – corrosion resistance, resistance to hydrogen permeation, fuel cells, materials for energy, magnetic materials, superconductors, photovoltaics, etc.

IP STATUS:
Patent Pending

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BYU TECHNOLOGY transfer

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