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Grain Boundaries From Theory To

Grain boundaries are a main feature of crystalline materials. They play a key role in determining the properties of materials, especially when grain size decreases and even more so with the

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current improvements of processing tools and methods that allow us to control various elements in a polycrystal. This book presents the theoretical basis of the study of grain boundaries and aims to open up new lines of research in this area.

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Grain boundaries : from theory to engineering

Central to the theory of grain-boundary sliding is the notion of a grain-boundary region, of finite width δ , distinguished from the crystalline lattices of the neighboring grains by a higher degree of positional disorder and, consequently, higher diffusivities D_b for the various atomic and molecular species and lower effective viscosity η_b .

Grain Boundary - an overview | ScienceDirect Topics

Grain boundaries are a main feature of crystalline materials. They play a key role in determining the properties of materials, especially when grain size decreases and even more so with the current improvements of processing tools and methods that allow us to control various elements in a polycrystal. This book presents the theoretical basis of the study of grain boundaries and aims to open up new lines of research in this area.

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Grain-boundary strengthening is a method of strengthening materials by changing their average crystallite size. It is based on the observation that grain boundaries are insurmountable borders for dislocations and that the number of dislocations within a grain have an effect on how stress builds up in the adjacent grain, which will eventually activate dislocation sources and thus enabling deformation in the neighbouring grain, too. So, by changing grain size one can influence the number of disloc

Grain boundary strengthening - Wikipedia

A grain boundary is the interface between two grains, or crystallites, in a polycrystalline material. Grain boundaries are 2D defects in the crystal structure, and tend to decrease the electrical and thermal conductivity of the material. Most grain

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boundaries are preferred sites for the onset of corrosion and for the precipitation of new phases from the solid.

Grain boundary - Wikipedia

Theory. Solute-atom segregation is a phenomenon of the change of local composition in an alloy at or near an inhomogeneity, such as a surface or a grain boundary. Solute-atom segregation at grain boundaries is a very important phenomenon both in theoretical and practical aspects due to its significant effect on the physical and mechanical properties of materials.

What is grain boundary segregation

Grain boundaries are a main feature of crystalline materials. They play a key role in determining the properties of materials, especially when grain size decreases and even more so with the current improvements of processing tools and methods that allow us to control various elements in a polycrystal.

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2013 ...

Grain Boundaries - From theory to Engineering, By Louissette Priester has been extremely helpful for me. Just thought I would pass it along. Thanks for the great discussion everyone!

What is the definition of a coherent boundary?

The theory is developed based on the decomposition of the thermodynamic conjugate forces into energetic and dissipative counterparts which provides the constitutive equations to have both energetic and dissipative gradient length scales for the grain and grain boundary.

A theory for grain boundaries with strain-gradient ...

For individual grain boundaries the dependence of grain boundary migration on misorientation and impurity content are addressed. Impurity drag theory, extended to include the interaction of ...

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How to extract microstructure map (just the grain boundary ...

New theory could lead to better batteries, fuel cells. In this image, different colors represent the crystallographic orientation of micrometer-sized grains making up a material called Yttria Stabilized Zirconia, used in fuel cells and other energy applications. The gray shade represents grain-boundary structural “disorder,” extent and the aqua and blue hue represents disordered regions.

New theory could lead to better batteries, fuel cells ...

Grain growth has long been described as motion by mean curvature (i.e., curvature flow) (1 ↓ - 3); grain boundaries (GBs) migrate toward their center of curvature, reducing the total GB area and energy.

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