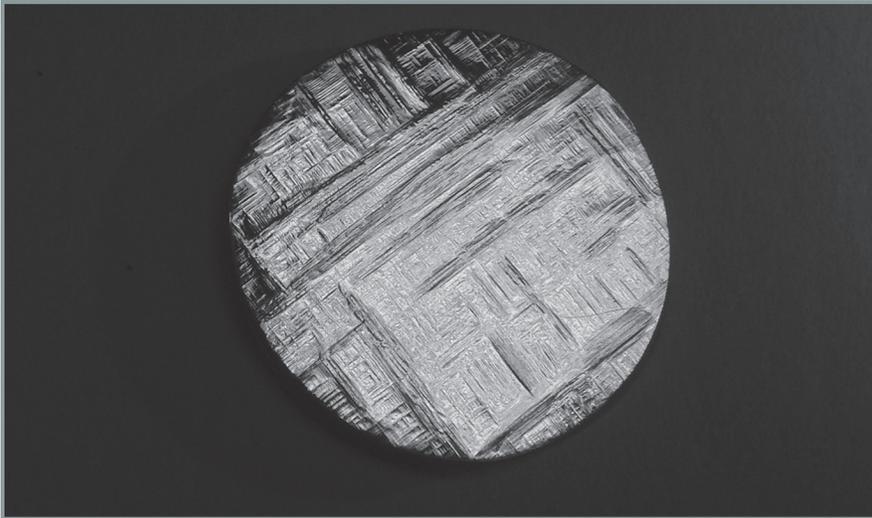


Decorative Steel Composition with a Crystalline Surface

UT-B ID 201102564



Technology Summary

A method for producing a new decorative steel with a crystalline surface was developed by an ORNL researcher. This invention potentially represents the first new decorative steel to be introduced since the development of Damascus steel around 1100 AD. In this invention, the type of decorative steel formed can be controlled by using crystals with different crystallographic orientations and by influencing the crystal growth process. The invention is suitable for a variety of applications where an enhanced appearance is desirable, including cutlery, hunting and military knives, knobs, auto components, jewelry, and decorative objects.

The invention describes how to grow a steel alloy, single crystal, or large-grained crystal body. The steel alloy includes at least two of the following elements: iron, nickel, or chromium. By cooling alloy components to a temperature of less than 250 K, the steel alloy body will have a surface with a macroscopic, martensitic phase feature. Because a residual amount of the martensitic phase is preserved when the alloy is returned to room temperature, a distinct macroscopic decorative pattern is then formed on the surface of the alloy.

The crystal or large-grain crystal can be polished to a bright or satin finish after shaping and any machining. The crystal is then cooled to temperatures at or below 250 K with liquid nitrogen. Multiple cooling and warming cycles can be used to enhance the decorative surface features.

Advantages

- New approach to decorative steel development
- Customization is possible by influencing the crystal growth process and managing heating/cooling cycles

Potential Applications

- Cutlery and other knives
- Decorative items
- Custom components for autos, firearms, and tooling applications
- Jewelry

Patent

Lynn A. Boatner. *Decorative Steel Composition Having a Texture Crystalline Surface*, U.S. Patent Application 13/213,148, filed August 19, 2011.

Inventor Point of Contact

Lynn A. Boatner
Materials Science and Technology Division
Oak Ridge National Laboratory

Licensing Contact

Alexander G. DeTrana
Senior Technology Commercialization Manager,
Materials Science
UT-Battelle, LLC
Oak Ridge National Laboratory
Office Phone: 865.576.9682
E-mail: detranaag@ornl.gov

