POPULAR SCIENCE ABSTRACT

Metallic materials are made of atoms, which are distributed in an orderly manner in space (crystal structure). In most cases, these are an agglomerate of crystals (grains) of ordered structure with a diameter of a few to several dozen thousandths of a millimeter (polycrystal). In certain cases a large, single crystal is used (monocrystal).

Of significance from the perspective of physical properties of poly and monocrystals is the arrangement of the crystal lattice relative to certain external system (respectively: texture, orientation). The arrangement of the lattice is shaped during the manufacture of finished metal elements. One of these may be plastic forming (deformation), e.g. rolling, extrusion, drawing.

Depending on the method of deformation, the crystalline lattice of most of grains (crystals) rotates in a manner characteristic for the given process. For example, in aluminum, nickel, silver or stainless steel, atoms in the grain space are arranged in an orderly manner, so that they form a cube, in the corner of which atoms are placed (also on the diagonals - crystalline lattice A1). The crystalline lattice of grains (crystals) of these metals during drawing or extrusion becomes arranged (texture) in a manner characteristic for the process - the edges and/or diagonals of the cubes are parallel with the axes of the deformed element, e.g. a rod. The ability of a metal to create such grain orientation (lattice rotation) varies. A measure of this capability is for instance the value of the so-called stacking fault energy.

The objective of the proposed research is to analyze the mechanisms of the reconstruction of crystalline grain lattice (crystals) during drawing metals with the A1 structure and different values of the stacking fault energy.