FCC Rolling Textures Reviewed in the Light of Quantitative Comparisons between Simulated and Experimental Textures - DTU Orbit (12/02/2019)

The crystallographic texture of metallic materials has a very strong effect on the properties of the materials. In the present article, we look at the rolling textures of fcc metals and alloys, where the classical problem is the existence of two different types of texture, the "copper-type texture" and the "brass-type texture." The type of texture developed is determined by the stacking fault energy of the material, the rolling temperature and the strain rate of the rolling process. Recent texture simulations by the present authors provide the basis for a renewed discussion of the whole field of fcc rolling texture. We simulate the texture development with a model which allows us to vary the strength of the interaction between the grains and to vary the scheme for the calculation of the lattice rotation in the individual grains (type CL/MA or PR/PSA). For the deformation pattern we focus on {111} slip without or with deformation twinning, but we also consider slip on other slip planes and slip by partial dislocations. We consistently make quantitative comparison of the simulation results and the experimental textures by means of a scalar correlation factor. We find that the development of the copper-type texture is best simulated with {111} slip combined with type CL/PR lattice rotation and relatively strong interaction between the grains—but not with the full-constraint Taylor model and neither with the classical relaxed-constraint models. The development of the brass-type texture is best simulated with {111} slip combined with PR/PSA lattice rotation and weak interaction between the grains. The possible volume effect of deformation twins on the formation of the brass-type texture is a controversial question which we discuss on the basis of our simulations as seen together with other investigations. © 2014 Taylor and Francis Group, LLC.

General information
State: Published
Organisations: Department of Wind Energy, Materials science and characterization, AGH University of Science and Technology
Contributors: Wierzbanowski, K., Wroński, M., Leffers, T.
Pages: 391-422
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Critical Reviews in Solid State and Materials Sciences
Volume: 39
Issue number: 6
ISSN (Print): 1040-8436
Ratings:
- BFI (2019): BFI-level 1
- Web of Science (2019): Indexed yes
- BFI (2018): BFI-level 1
- Web of Science (2018): Indexed yes
- BFI (2017): BFI-level 1
- Scopus rating (2017): CiteScore 5.78 SJR 1.51 SNIP 2.616
- Web of Science (2017): Impact factor 5.656
- Web of Science (2017): Indexed yes
- BFI (2016): BFI-level 1
- Scopus rating (2016): CiteScore 5.65 SJR 1.924 SNIP 2.314
- Web of Science (2016): Impact factor 6.455
- BFI (2015): BFI-level 1
- Scopus rating (2015): CiteScore 5.76 SJR 1.974 SNIP 2.37
- Web of Science (2015): Impact factor 5.556
- BFI (2014): BFI-level 1
- Scopus rating (2014): CiteScore 5.19 SJR 1.626 SNIP 2.286
- Web of Science (2014): Impact factor 6.45
- Web of Science (2014): Indexed yes
- BFI (2013): BFI-level 1
- Scopus rating (2013): CiteScore 5.97 SJR 1.838 SNIP 2.279
- Web of Science (2013): Impact factor 2.714
- ISI indexed (2013): ISI indexed yes
- BFI (2012): BFI-level 1
- Scopus rating (2012): CiteScore 8.07 SJR 3.435 SNIP 3.787
Web of Science (2012): Impact factor 5.947
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 8.3 SJR 3.651 SNIP 2.955
Web of Science (2011): Impact factor 9.467
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 2.712 SNIP 2.962
Web of Science (2010): Impact factor 6.143
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 3.312 SNIP 2.945
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 2.588 SNIP 1.785
Scopus rating (2007): SJR 3.236 SNIP 2.504
Scopus rating (2006): SJR 1.971 SNIP 1.594
Scopus rating (2005): SJR 2.256 SNIP 1.334
Scopus rating (2004): SJR 3.417 SNIP 2.627
Scopus rating (2003): SJR 1.631 SNIP 1.235
Scopus rating (2002): SJR 1.361 SNIP 1.529
Scopus rating (2001): SJR 1.105 SNIP 1.016
Scopus rating (2000): SJR 2.313 SNIP 1.916
Scopus rating (1999): SJR 2.427 SNIP 2.335

Original language: English
Keywords: brass type texture, copper type texture, correlation factor, deformation model, lattice rotation, Brass, Computer simulation, Copper, Crystal lattices, Deformation, Materials properties, Metallurgy, Rolling, Brass type texture, Copper type texture, Correlation factors, Deformation modeling, Lattice rotations, Textures

DOIs: 10.1080/10408436.2014.899485
Source: FindIt
Source-ID: 268528399
Research output: Research - peer-review › Journal article – Annual report year: 2014