Oxide dispersion-strengthened steel PM2000 after dynamic plastic deformation: nanostructure and annealing behaviour - DTU Orbit (05/11/2017)

Oxide dispersion-strengthened steel PM2000 after dynamic plastic deformation: nanostructure and annealing behaviour
The microstructure, texture and mechanical properties have been studied in PM2000 compressed via dynamic plastic deformation to a strain of 2.1. It is found that dynamic plastic deformation results in a duplex ⟨111⟩ + ⟨100⟩ fibre texture and refines the initial microstructure by nanoscale lamellae, which substantially increases the strength of the material, but decreases its thermal stability. In the as-deformed microstructure, the stored energy density is found to be higher in ⟨111⟩-oriented regions than in ⟨100⟩-oriented regions. Recovery during annealing at 715 °C reduces the energy stored in the deformed microstructure. This reduction is more pronounced in the ⟨111⟩-oriented regions. Orientation-dependent recrystallisation takes place in the recovered microstructure, leading to strengthening of the ⟨111⟩ fibre texture component at the expense of the ⟨100⟩ fibre texture component.

General information
State: Published
Organisations: Department of Wind Energy, Materials science and characterization, Department of Mechanical Engineering, Materials and Surface Engineering, Sino-Danish Center for Education and Research, Chinese Academy of Sciences
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Pages: 5545-5555
Publication date: 2016
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Materials Science
Volume: 51
Issue number: 11
ISSN (Print): 0022-2461
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.49 SJR 0.762 SNIP 1.064
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.811 SNIP 1.081 CiteScore 2.36
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.985 SNIP 1.431 CiteScore 2.54
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.933 SNIP 1.472 CiteScore 2.36
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.991 SNIP 1.407 CiteScore 2.2
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.941 SNIP 1.393 CiteScore 2.05
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.965 SNIP 1.097
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.842 SNIP 0.963
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
