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Data Article

Precipitation behavior in a nitride-strengthened martensitic heat resistant steel during hot deformation

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ABSTRACT

The stress relaxation curves for three different hot deformation processes in the temperature range of 750–1000 °C were studied to develop an understanding of the precipitation behavior in a nitride-strengthened martensitic heat resistant steel (Zhang et al., Mater. Sci. Eng. A, 2015) [1]. This data article provides supporting data and detailed information on how to accurately analysis the stress relaxation data. The statistical analysis of the stress peak curves, including the number of peaks, the intensity of the peaks and the integral value of the pumps, was carried out. Meanwhile, the XRD energy spectrum data was also calculated in terms of lattice distortion.

Specifications Table

Subject area	*Material science and engineering*
More specific subject area	*Microstructure, precipitates*
Type of data	*Table, image (x-ray, microscopy, curve),.opj file*
How data was acquired	*Microstructure observation using SEM, TEM, and OM, calculation using XRD, EDAX, Origin software. Raw data gained by Gleeble3500*
Data format	*Raw stress curves data, and analyzed computational data, and raw.jpg files for microstructure*

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Experimental factors	*cast*
Experimental features	*Heated at1200 °C for 5 min then cooled down to a certain temperature then deformed and isothermal holding for a certain time*
Data source location	*2nd Jinji Road, Qixing District, Guilin, Guangxi, China*
Data accessibility	*data available in this article*

Value of the data

- The methods behind the data presented here for particle precipitation behavior during hot deformation of heat resistant steel might be useful for some other kind of alloy.
- The data presented here may facilitate the improvement of the particle nature steel's final state.
- The microstructure illustrated in this paper may illuminate softening mechanisms taking place as well as insight into microstructure evolution during hot deformation.

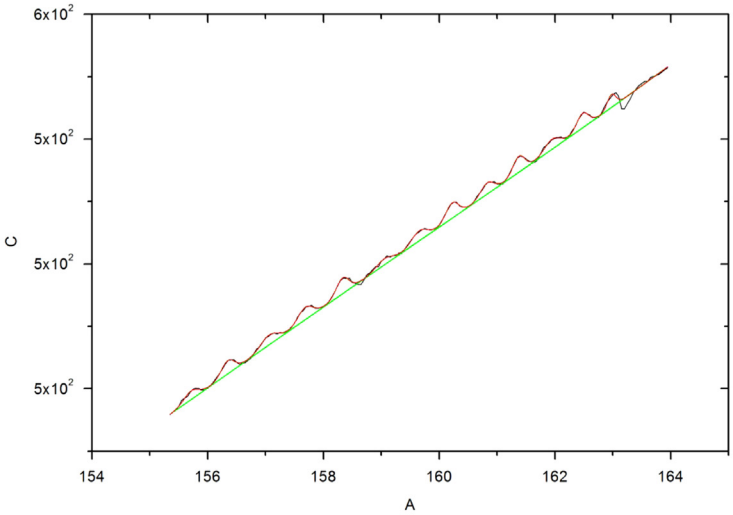
Peak Analysis

Data Set:[Book1]Sheet2!C Date:2015/3/14

Baseline:Poly5

Chi^2=2.24147E-002 Adj. R-Square=9.99653E-001 # of Data Points=173.

SS=3.00357E+000 Degree of Freedom=134.



Fitting Results

Peak Index	Peak Type	Area Intg	FWHM	Max Height	Center Grvty	Area IntgP
1.	Gaussian	0.21161	0.28888	0.68922	155.71301	6.00934
2.	Gaussian	0.29624	0.2638	1.05495	156.34761	8.41279
3.	Gaussian	0.27755	0.33173	0.78599	157.0584	7.88197
4.	Gaussian	0.31208	0.29784	0.98436	157.68752	8.86255
5.	Gaussian	0.34214	0.2562	1.25454	158.33088	9.71614
6.	Gaussian	0.16326	0.31495	0.48697	159.0478	4.63628
7.	Gaussian	0.26	0.30757	0.79412	159.65503	7.38352
8.	Gaussian	0.33402	0.25724	1.21983	160.22456	9.48563
9.	Gaussian	0.25448	0.26909	0.88842	160.82805	7.22678
10.	Gaussian	0.32468	0.23918	1.27524	161.37645	9.22034
11.	Gaussian	0.2564	0.3035	0.79364	161.94946	7.2813
12.	Gaussian	0.29762	0.24112	1.15954	162.47834	8.45187
13.	Gaussian	0.19126	0.17336	1.03644	162.97769	5.43149

Fig. 1. The stress wave statistical analysis.