A notice of conference proceedings publication

Because there is a large amount of papers submitted to ICAS 2010, the organizing committee has decided to publish the conference proceedings in the form as follows:

- A printed hard copy of full papers of all keynote speakers;
- A printed hard copy of extended abstracts for contributing papers, the extend abstract for each paper is just one page in length;
- A CD for all contributing full papers accepted to publish, both for oral sessions and poster session;
- All of the above-mentioned printed hard proceedings and the CD of the full papers will be formally published by the Metallurgical Industry Press of China.

It is therefore required that each contributing author should submit an extended abstract together with the full paper. Please note that your early submission of extended abstract and full paper is highly appreciated although the deadline of submission is September 30, 2010.

- The extended abstract is just one page in length and camera-ready A4 size for each paper.
- The extended abstract is a highly extracted version of your paper, which should briefly describe the purpose, experimental procedure and the obtained results of your paper.
- The extended abstract for each paper has a similar structure and print format to that of the corresponding full paper, except that it normally does not include several parts such as abstract, key words, and conclusion. If necessary, you can use at most 3 figures in the extended abstract and the width of each figure is about 50 mm.
- If necessary, at most 3 references can be included in the extended abstract.
- In addition, for the purpose of easy access to the author(s), email address of the corresponding author should be given at the end of the extended abstract of each paper. The contact email will be arranged as the last line of the page and separated from the context by a line.
- An example for the extended abstract is shown here.

Microstructure, Mechanical Properties and Work Hardening Behavior of Medium Manganese Steel Processed through ART-Annealing

Cao Wenquan[1], Shi Jie[1], Dong Han[1], Weng Yuqing[2]
(1.Central Iron and Steel Research Institute, Beijing 100081, China; 2.The Chinese Society for Metals, Beijing 100711, China)

1. Introduction

High strength steel sheets have been increasingly applied in automobiles[1]. As an index of formability and absorbed energy of materials, the product of ultimate tensile strength (Rm) to total elongation (A), Rm×A, has been applied to characterize the auto materials[2]. In this study, the research on the 3rd generation auto sheet steel was carried out to develop high strength and high ductility steel at lower cost. Ultrafine grained duplex microstructure, mechanical properties and substantially enhanced work hardening behavior of the medium manganese steels treated by sub-critical and/or intercritical annealing through austenite reverted transformation (ART-annealing) were demonstrated and analyzed in this study.

2. Experimental

Medium manganese steels (3-9%Mn and 0.01-0.40%C) were prepared by high frequency induction furnace in a vacuum atmosphere. The cast ingots were soaked at high temperature and hot formed into specimens, and lastly cooled in furnace to room temperature. These hot formed specimens were quenched into oil after austenization at 750°C for half an hour and then intercritical annealing by austenite reverted transformation (ART-annealing) at 650°C in electrical box furnace with different time and finally air cooled to room temperature. Microstructure and mechanical properties of the experimented steels were investigated by transmission electron microscopy (TEM), electron back scattered diffraction in scanning electron microscopy with field emission gun (EBSD-FEG/SEM), X-ray diffraction (XRD) and tension test. Manganese contents in ferrite and austenite were measured by STEM and the carbon content in austenite was measured by XRD.

3. Results and Discussion

Microstructure of 0.2C-5Mn steel after ART-annealing treatment was given in Figure 1. It is clear that an ultrafine grained austenite-ferrite duplex microstructure was developed after ART-annealing. The inserted figure in Figure 1 indicates the lean-Mn content in ferrite laths and rich-Mn content in austenite laths examined by STEM, implying the strong Mn-partition during ART-annealing process. The true stress-strain curves were examined by uniaxial tension test and presented in Figure 2, showing an excellent combination of strength and ductility of the experimented steels. The significantly improved ductility was analyzed based on the three-stage work hardening behavior as given in Figure 3. The high Rm×A product was attributed to the transformation aided plasticity from the large fractioned austenite.

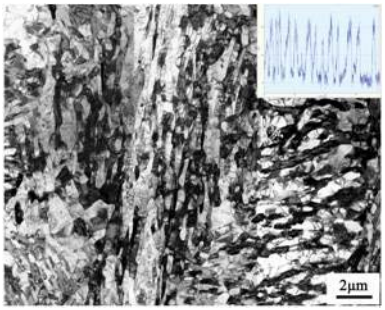

Figure 1 TEM microstructure

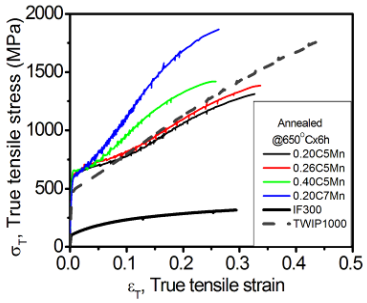

Figure 2 Stress-strain curves

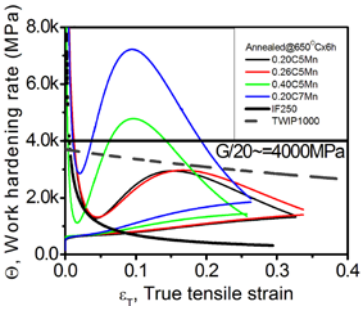

Figure 3 Work hardening rate

References

[1] Sugimoto K, Iida T, Sakaguchi J et al (2000) Retained austenite characteristics and tensile properties in a TRIP type bainitic sheet steel. ISIJ 9: 902-908

[2] Heimbuch R (2009) Overview:Steel Lightweightening Project. http://www.a-sp.org. Cited 1 Apr 2009

Contact email: caowenquan@nercast.com (Cao Wenquan)