

Accepted Manuscript

Effect of solution treatment on microstructure and tensile properties of a U720LI Ni-based superalloy

Zhipeng Wan, Lianxi Hu, Yu Sun, Tao Wang, Zhao Li, Yong Zhang



PII: S0042-207X(18)31000-5

DOI: [10.1016/j.vacuum.2018.07.041](https://doi.org/10.1016/j.vacuum.2018.07.041)

Reference: VAC 8132

To appear in: *Vacuum*

Received Date: 12 June 2018

Revised Date: 25 July 2018

Accepted Date: 27 July 2018

Please cite this article as: Wan Z, Hu L, Sun Y, Wang T, Li Z, Zhang Y, Effect of solution treatment on microstructure and tensile properties of a U720LI Ni-based superalloy, *Vacuum* (2018), doi: 10.1016/j.vacuum.2018.07.041.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

**Effect of solution treatment on microstructure and tensile properties of a U720LI
Ni-based superalloy**

Zhipeng Wan^{1, 2, 3}, Lianxi Hu^{1, 2*}, Yu Sun^{1, 2**}, Tao Wang³, Zhao Li³, Yong Zhang³

*1 National Key Laboratory for Precision Hot Processing of Metals, Harbin Institute of
Technology, Harbin 150001, P.R. China*

*2 School of Materials Science and Engineering, Harbin Institute of Technology,
Harbin 150001, China*

*3 Science and Technology on Advanced High Temperature Structural Materials
Laboratory, AEEC Beijing Institute of Aeronautical Materials, Beijing 100095, P.R.
China*

Abstract:

The effect of solution treatment in a range from 1130°C to 1150°C on the microstructure and tensile properties of an as-forged U720LI superalloy was investigated under various temperatures between room temperature and 750°C of tensile tests. It was revealed that a high solution treatment temperature leads to coarsening of grains and secondary gamma prime precipitates, and thus decreases of room temperature and 400°C strength and ductility. A combination of ductile and brittle mode characterized by dimples and quasi-cleavage facets feature was observed for 1130°C and 1140°C solution treatment. The initiation and coalescence of microvoids at the interface of matrix and precipitates as well as the planar-slip process promoted the formation of quasi-cleavage fracture. In addition, a mixed intergranular and transgranular quasi-cleavage fracture with some dimples features for 1150°C solution treatment was also identified under 750°C tensile test.

Keywords: U720LI superalloy; Heat treatment; Tensile test; Fracture mechanism;

* Corresponding author.

** Corresponding author.

Tel.: +86 451 86418613. Fax: +86 451 86418613.

E-mail addresses: lianxi_hu_hit@163.com (L.X. Hu), yusun@hit.edu.cn (Y. Sun).

Download English Version:

<https://daneshyari.com/en/article/8044025>

Download Persian Version:

<https://daneshyari.com/article/8044025>

[Daneshyari.com](https://daneshyari.com)