Manuscript ID : 00000-48938

Source ID : 00000002

International Journal of Mechanical Engineering and Technology

Volume 8, Issue 1, January 2017, Pages 200-207, Page Count - 8

BEHAVIOR TO DAMAGE OF TWO HARDENING PRECIPITATION COPPER ALLOYS: EXPERIMENTAL CHARACTERIZATION AND NUMERICAL STUDY

B. Saadouki [1] J. Nattaj [2] M. Elghorba [3]

[1] Laboratory of Control and Mechanical Characterization of Materials and Structures, National Higher School of Electricity and Mechanics, University of Hassan II, Casablanca, Morocco.
[2] Laboratory of Atmosphere's Physics and Modeling, Sciences and technologies Faculty, University of Hassan II, Casablanca, Morocco.
[3] Laboratory of Control and Mechanical Characterization of Materials and Structures, National Higher School of Electricity and Mechanics, University of Hassan II, Casablanca, Morocco.

Abstract

In this work, we basically want to compare the mechanical behavior of two cuprous precipitation hardening. In the first part, we characterized experimentally both cuprous by simple tensile tests, the Cu-Ni-Si displays a more interesting mechanical behavior that Cu-Co-P. For the second part, the damage behavior has been studied numerically by measuring the variation of the ultimate residual stress as a function of the notch length; this parameter reflects the strength loss for tensile test. We have reproduced the phenomenon of damage faced during the deterioration of materials through a static damage theory and a reliability optimization of damage. The specimens underwent progressive damage progressively as their notches become larger until they arrive at failure, the evolution of the damage starts with an introductory stage followed by propagation of damage to major notches and finally a brutal damage leads to failure. This study has reliably predicted the fracture behavior for these cuprous.

Author Keywords

Cuprous, notch, damage-reliability, ultimate residual stress, life fraction.

ISSN Print: 0976-6340
ISSN Online: 0976-6359
Source Type: Journals
Document Type: Journal Article
Publication Language: English
DOI:
Abbreviated Journal Title: IJMET
Access Type: Open Access
Publisher Name: IAEME Publication
Resource Licence: CC BY-NC
Major Subject: Physical Sciences
Subject Area classification: Engineering and Technology
Subject area: Mechanical Engineering
Source: SCOPEDATABASE

Reference

References (5)

1. Fujiwara H., Sato T., Kamio A
   Effect of alloy composition on precipitation behaviour in Cu-Ni-Si alloys

(1998) Journal off the Japan Institute of Metals, Volume 62, Issue 4, Page No 301-309,
DOI: https://doi.org/10.2320/jinstmet1952.62.4_301
Article Link: https://www.jstage.jst.go.jp/article/jinstmet1952/62/4/62_4_301/_article

2. J.M.Pelletier, R.Borrelly et P.F.Gobin
   Influence of precipitation on the thermoelectric power of copper-cobalt alloys

   (1977) Metallurgical writings, Volume 2, Page No 553-556,

3. PETERSON
   Stress concentration factors

   (1974)

4. Shalini Kumari, Ajeet Kumar Rai, Devendra Kumar Sinha and Rahul Charles Francis
   DEFORMATION BEHAVIOR AND CHARACTERIZATION OF COPPER ALLOY IN EXTRUSION PROCESS

   (2015) International Journal of Mechanical Engineering and Technology, Volume 6, Issue 7, Page No 74-80,
   Article Link: http://iaeme.com/MasterAdmin/Journal_uploads/IJMET/VOLUME_6_ISSUE_7/IJMET_06_07_009.pdf

5. T. Prabhu and Mr. A. Arulmurugu
   EXPERIMENTAL AND ANALYSIS OF FRICTION DRILLING ON ALUMINIUM AND COPPER

   (2014) International Journal of Mechanical Engineering and Technology, Volume 5, Issue 5, Page No 130-139,
   Article Link: http://iaeme.com/MasterAdmin/Journal_uploads/IJMET/VOLUME_5_ISSUE_5/IJMET_05_05_014.pdf