

26th International Conference on
Nanotechnology and Nanomedicine

May 13, 2022 | Webinar

Received date: 31-01-2022 | Accepted date: 01-02-2022 | Published date: 25-05-2022

Effects of Y and Gd on creep properties of hot-rolled Mg-1Zn-1.5Y-3.75Gd

H M M A Rashed, S Talapatra, A Saha, H Chowdhury, U Das and M T Oyshi

Bangladesh University of Engineering and Technology, Bangladesh

Magnesium alloys containing rare earth elements has received appreciable consideration owing to greater strength from precipitation hardening, in addition to high strength to weight ratio and better fuel economy from the lightest structural metal - magnesium. In this work, creep properties of Mg-1%Zn-1.5%Y-3.75%Gd alloy were investigated at different temperatures such as 250, 300, 350 and 400°C. The addition of rare earth elements like such as yttrium (Y) or gadolinium (Gd) has improved strength from significant contribution to solid solution strengthening and precipitation strengthening. Optical microscopy revealed the larger grain size in the as-cast and homogenized condition, which were notably reduced by dynamic recrystallization during hot rolling at 370°C. Thermal stability of the phases were studied using heat flow patterns in Differential Scanning Calorimetry. Micrographs of Scanning Electron Microscopy (SEM) were analysed to calculate the extent of precipitation size and shape in image analysis processing software package. Precipitation kinetics were predicted using CALPHAD method with the support from KWN Model. It was expected that a long-period stacking ordered (LPSO) phase contribute significantly to high temperature strength of the material. Presence of LPSO phase would refine the grains and twinning did not act as nucleation site.

Recent Publications

1. H M M A Rashed, M A Islam, F B Rizvi. Effects of process parameters on tensile strength of jute fiber reinforced thermoplastic composites. *Journal of Naval Architecture and Marine Engineering*. 2006; 3(1): 1-6
2. N Nafsin, H M M A Rashed. Effects of Copper and Magnesium on Microstructure and Hardness of Al-Cu-Mg Alloys. *International Journal of Engineering and Advanced Technology*. 2013; 2(5): 533-536
3. Hossain M M A Rashed. Control of Distortion in Aluminium Heat Treatment. *Fundamentals of aluminium Metallurgy*. 2018; 495-524.

Speaker Biography

H M Mamun Al Rashed is an Asstt. Prof, BUET from 2011 till date. Previously he was a Lecturer at BUET from 2001-2011. He completed his Ph.D. in Material Science in the year 2010 at University of Manchester, UK. He was Awarded HEQEP Sub-project in 2014. CP No. 3117, titled "Development of facilities to study hot deformation behavior of steel and light alloy materials". Duration: July 2014 -June 2016. He organised and coordinated a seminar on "Impact of quality of steel in Civil Engineering applications". He is working as a reviewer for many journals like *Journal of materials science and engineering applications*, *Materials science & Materials engineering*, *Journal of materials science*, *Materials letters*, *Elsevier* and more.

e: hrashed@mme.buet.ac.bd

 Notes: