Development of Novel Magnesium Alloys by Innovative Technologies

Abstract

During the past 15 years we have developed, made and tested strong RS magnesium alloys under different sponsorships (National NSF, Province Science Foundation and Companies). During this stage we have developed a large number of alloys that contain zinc, zirconium and Re metals in small quantities. The idea to develop these alloys is based on the stable Mg-Zn-Y quasi-periodic strengthening particles. In this presentation we summarize the experimental work, illustrate the way the alloys have been prepared and present different results, including microstructure and mechanical properties of these alloys.

Xuefeng Guo

Curriculum Vitae

After finishing his master degree program in 1986, he joined the Casting Iron Institute in Xi'an University of Technology and began his horizontal continuous cast iron research for several years and built 5 factories in China. On receiving his doctorate from Northwestern Polytechnical University in 1998, he worked at Xi'an Jiaotong University for a year as a post-doctorate fellowship, and then he went to Technion-Israel Institute of Technology for a year's research with Distinguished Professor Dan Shechtman. At the Technion he studied the principles of solidification and the preparation and characterization of ultrahigh strength magnesium alloys by rapid solidification and extrusion. After his Technion research, he joined the department of materials science & engineering at Xi'an University of Technology in 2001 as a Professor and vice dean. During 2005-2007, he was on Sabbatical at Iowa State University and Ames Lab of US DOE, where he studied rapidly solidified magnesium alloys. During 2009-2013 he spent two to three months each year on Sabbatical research at Ames Lab, where he continued his studied on the characterizing of magnesium alloys and intermetallics with B2 structures. He is now working as a Professor and vice dean at the Materials Science & Engineering Department of Henan Polytechnic University, and focusing his research on solidification of intermetallics with B2 structures and magnesium alloys' preparations in the solidification center headed by him.

During the past 15 years his research group has developed, made and tested strong RS magnesium alloys under different sponsorships (National NSF, Province Science Foundation and Companies). The idea to develop RS magnesium alloys is based on the stable Mg-Zn-Y quasi-periodic strengthening particles. Some of the developed alloys that contain zinc, zirconium and Re metals in small quantities have been used in industries. He published 160 papers in English and Chinese.