

Magnesium Alloys: Concept of Design and Recent Developments

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Magnesium (Mg) is one of the most fascinating metallic materials, which excites many experts in various fields from the moment of its discovery slightly over 200 years ago. It is the lightest structural metal having the density of less than 25% of that in steels, 40% in titanium and 70% in aluminium (Al). The spectrum of Mg applications spans from light-weight mobility, including automotive and aerospace sectors, to bio-degradable implants to hydrogen storage. Recent achievements include the lift of FAA ban from using Mg alloys in aircraft cabins, development of commercial technologies for Mg sheet production, clinical approval of Mg bio-implants, etc.

The most recent wave of interest in Mg and its alloys was inspired by the development of new generation of wrought Mg alloys in late 1990-th. These efforts allowed to tackle the problem of low-temperature deformability and design alloys having strength higher than the strongest Al alloys of 7xxx series. Nevertheless, the control of strength, ductility and plastic anisotropy as well as very high chemical reactivity of Mg remain major barriers in the wide proliferation of Mg alloys into real-life products.

In this talk, an overview of the latest concepts in magnesium alloy design principles, parameters affecting the material performance and achievements in commercial applications will be presented along with our efforts and contributions in this area.

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