

New aviation Magnesium alloys and advanced production technology

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The development of modern production of aircraft engines, which, along with the usual requirements for the design becomes more and more important to reduce weight, making the use of lightweight materials based on magnesium very promising. The use of magnesium alloy castings can significantly reduce the weight of the engine, which increases speed, payload, range, mileage, reducing fuel consumption. Ever-increasing demands for reliability and durability of aircraft equipment necessitates the development of new magnesium alloys with a high level of mechanical and performance properties.

Based on the criteria chosen are designed and the influence of a number of elements (Si, Sc, Ti, Zn, Ge, Y, Zr, Ag, Sn, Nd, Hf, and Pb) at 0.05 ... 1.0% by weight. the structure and properties of magnesium alloy Mg-Al-Zn.

The studies show the role of forming doped magnesium alloys intermetallic phases. The dependence of the morphology and topology of these phases of the chemical composition of magnesium alloys and their influence on the structure and properties of metal. It is shown that alloying elements magnesium alloys investigated grinds intermetallic phase. Found that a greater impact on improving the mechanical properties of magnesium alloys are spherical intermetallic smaller size groups, and the heat resistance of magnesium alloys increases with increasing melting of alloying elements and is determined primarily by the number of heat-resistant intermetallic phase.

Studies have shown that with the help of some technological factors (high-temperature processing of magnesium melt, filtration modification, the melt processing of carbonaceous materials and alkaline earth metals) can be controlled structure formation of magnesium alloys and significantly improve the quality parameters of the castings.

It is shown that the net effect of individual technological factors produces high quality castings of magnesium alloy that provides a guaranteed increase durability and reliability of the aircraft engines.

Developed new magnesium alloys with a high number of properties and their production technologies are tested at industrial enterprises of Ukraine.

Biography

Shalomeev V.A. has a Doctor of Science in 2011. He is lecturer of Zaporizhzhya National Technical University (Ukraine). Expert in the field of materials science. He has more than 100 publications, the author of 25 patents.

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Solar energy production from space using novel materials

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A SWOT Analysis is performed for the viability of Space Solar Power. It can be foreseen that Space Solar Power can become a reality one day. However there are many other challenges such as cost, technology etc, which are its major hindrance. A suitable analysis is drawn from works of many scientists and experts in this field and a conclusion is drawn.

Apart from cost other reason such as in selection of a suitable material is also a big challenge. An analysis of existing materials is presented as well as existing techniques and methods of production. Solar light can be directly converted to laser light using suitable materials. However greater Solar to Laser conversion efficiency is required. Optimism proves that Space Solar Power can become a way forward in future. Novel materials and techniques are adopted to efficiently convert solar to laser light which are discussed in this paper.

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