

SMM Hot News

2nd China Auto New Materials Application Summit Conference Takeaway

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Overview

The **2nd China Auto New Materials Application Summit 2020** and **China (8th) Aluminium Processing Industry Chain Demand and Supply Trading Summit**, jointly held by Shanghai Metals Market with the Nonferrous Metals Society of Shanghai, Shanghai Automotive Engineering Society and Suzhou Die-casting Technology Association, took place in Shanghai on September 17.

The aim of the Summit was to promote innovative, integrated and green development of new materials and automobiles, and build leading new energy vehicle (NEV) industry clusters. Please find the summary of the keynote speeches of the conference.

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1. Application of aluminium extrusion in NEVs

Sun Wei, vice general manager of Zhongwang Group delivered a speech on "Application of high-end aluminium extrusion in new energy vehicles".

In the future, market shares of NEVs will increase gradually as automobiles develop towards light weight, and thus the use of aluminium alloy will increase, among which the proportion of extruded materials mainly used for battery packs and car bodies will also increase. The proportion of extruded materials used is expected to reach more than 15% in 2030.

The application of aluminium alloy in NEVs has many advantages, such as lighter car weight, longer travel distance, stable operation, shock absorption and easy for recycling. For every 10% reduction in vehicle weight, fuel efficiency and travel distance can be increased by 6-8% and 13.5% respectively, and acceleration time for 100 km can be reduced by 5%.

2. Developments of high-temperature and high-strength aluminium alloy tube/sheet is an upcoming trend

Dr. Nie Cunzhu, director of the aluminum alloy research office of Shanghai Huafo Material Science and Technology Research Institute, gave his insights on the aluminium brazing pipe materials for cooling in high temperature, from the aspects of application background, alloy composition and process design. With the development of automobile engine technology and the implementation of higher standards for vehicle emissions, the development of high-temperature and high-strength aluminium alloy tube/sheet is a general trend in the field of heat exchange application.

The modified 3003 aluminium alloy (contains magnesium) boasts better high-temperature performance.

1. Controllable atmosphere brazing: Adding 0.2-0.3% magnesium into the alloy can significantly improve its high-temperature strength. For example, compared with the 3003 aluminium alloy, strength of the modified alloy increases by about 200% at 230 °C.
2. Vacuum brazing: Adding 0.4-0.6% magnesium into the alloy can significantly improve its strength in high temperature.

3. Development trend of aluminium extrusion for automobiles

Li Jianxiang, chairman of Guangdong Hoshion, delivered a speech on automotive aluminium alloy extruded extrusion and application cases, from the aspects of performance requirements, materials selection, secondary development and process development, introduction and application cases of automotive aluminum alloy materials.

Li also said that the main demand for aluminium alloy used in automobiles is to replace steel and realise lightweight. According to requirements given in China's automobile lightweight circuit diagram (2016-2020), aluminum alloy is described as the 5-series and 6-series high formability alloys, with a single vehicle consumption of 190kg, and there is no quantitative index for alloy strength.

4. Application of aluminium alloy in chassis parts of NEVs

Zhong Gu from **Chinalco Suzhou Research Institute** gave his insights on the application of aluminium alloy in chassis parts of NEVs. He said more than 600 aluminum parts are used in car body, chassis, power and transmission systems. The amount of

aluminium used in automobiles is growing rapidly in all countries/regions, especially in North America and China.

Aluminum is mainly used in body structure parts, wheel hub, body covering parts, transmission system and cylinder head. The amount of aluminium used in C-grade and above vehicles is far more than that in A and B-grade vehicles. In 2018, 3.8 million mt of aluminium were used in automobiles (2.9 million mt in castings). The development of NEVs boosted aluminium consumption.

5. Application of Die-cast Aluminum Alloy in 5G Base Station

Duan Junwei, head of development department of Guangzhou Nonferrous Metals Application Research Institute of Chinalco, said that the typical 5G macro base station uses die-cast aluminum alloy, aluminum alloy extrusion and aluminum alloy plates and strips. In terms of weight, die-cast aluminum alloy accounts for the vast majority, followed by extrusion, and less plates and strips. They are mainly used in the antenna, RF device, radiator, base frame (such as switchboard chassis) and support of base station.

The application of die-cast aluminum alloy in 5G base station also includes the shell structure of RF devices such as antenna vibrator and metal cavity filter, the reflective backplane of AAU(AFU), and the heat dissipation shell.

In addition to AAU's extensive use of die-cast aluminum alloy, other equipment such as BBU, power supply and battery all use die-cast aluminum alloy, and die-cast aluminum alloy used for single base station equipment are about 93kg.

According to the data from the Ministry of Industry and Information Technology (MIIT), China will complete the construction of 6 million 5G base stations within 7 years from 2020. This will require 558,000 mt of die-cast aluminum alloy, according to preliminary estimates.

6. TCB seed crystal alloy and its application technology in automobile aluminum alloy

Liu Xiangfa of Shandong University said that the aluminum alloys of 7xxx and 2xxx series are poisoned by Zr, Cr, V, etc., which make the grains of DC casting billet coarse. It also leads to segregation, shrinkage porosity, hot cracking, cast rod cracking, accompanied by feather-like crystal, bright crystal, uneven structure and other defects. Coarse grains also increase anisotropy, poor deformability, high rate of spoiled products and unstable quality.

The refining poisoning caused by Si element in Al-Si alloy leads to extremely coarse α -Al dendrites or eutectic clusters, causing many problems, such as composition segregation, snowflake spot, shrinkage porosity, shrinkage porosity and so on. That significantly reduces the strength and toughness, fatigue performance, structure compactness, structure uniformity and product consistency of castings. In addition, the refining poisoning phenomenon of UHS aluminum alloy and the influence of α -Al grains on UHS aluminum alloy are also discussed.

Anti-poisoning TCB seed crystal alloy has obvious advantages, which can solve the problems of grain refinement poisoning, hot cracking, shrinkage porosity, and solve the contradiction between grain refinement and improvement of electrical and thermal

conductivity with low application cost of TCB technology.

TCB is not only a "super seed refiner", but also a new seed crystal technology to enhance the added value of aluminum alloy products, and it is the key for R&D in aluminum alloy new materials and processing technologies.

7. New materials of aluminum alloy plate and strip for new energy vehicles

Deng Songyun, vice president of Research Institute of Guangxi Alnan Processing Co., Ltd., said that the emergence of new energy vehicles has greatly promoted the development of new materials. Deng also gave details on the battery bottom plate 6061 and processing stability 6111, which include impact resistance (Charpy test $\geq 9.27\text{J}$, conventional $7\sim 8\text{J}$), strength, weldability, aging stability, Baking hardening and machinability (punching and riveting).

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