DEVELOPMENT OF MICROSTRUCTURE AND PHASE COMPOSITION OF ZN-Al-Mg ALLOY WITH VARIOUS AMOUNT OF Sn

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Abstract

Zn alloys are commonly used for coatings of steel products of various shapes and applications. This is due to their corrosion resistance, toughness and also decorative properties, which can be further improved by suitable alloying. Two main alloying elements are Al and Mg. Aluminium creates a passivation layer which improves a corrosion resistance, brings higher brightness with higher amount of spangles. Magnesium brings also a higher corrosion resistance, however it decreases formability at higher concentrations mainly due to presence of brittle Zn2Mg phase. Poster deals with the modification of Zn-based ternary system with 1.6 wt. % of Al and 1.6 wt. % of Mg. Sn was added into molten alloy in the production process on defined concentrations: 0, 0.5, 1, 2 and 3 wt. %. Tin effectively neutralises highly reactive elements as silicon and phosphor in zinc bath and prevents from excessive coarsening of coating. However, high amount of tin increases a tendency to intergranular corrosion. Cylindrical cast of five alloys with different amount of tin was prepared. Development of microstructure and phase composition was observed using scanning electron microscopy, x-ray diffraction and differential scanning calorimetry. Increasing amount of Sn causes changes in formation of phases during solidification process and modifies quantity of phases present in alloy: Zn, Al, Zn2Mg and Mg2Sn. It was found out that amount of Mg2Sn increases with increasing tin content at the expense of Zn2Mg.

Keywords: Zn-based alloys, hot dip coating, steel, XRD, DSC

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