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The role of tin and magnesium in assisting liquid phase sintering of aluminum (Al) (Conference Paper) (Open Access)

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Abstract

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This study aims to investigate the effect of tin (Sn) and magnesium (Mg) on the sintering response of sintered Al. Although this topic has been extensively reported, details on the combined effect of Sn and Mg that function as sintering additives are still limited. The current study discusses the effect of the combined use of Sn and Mg to assist aluminium (Al) in liquid phase sintering via the powder metallurgy technique. The results demonstrated that the densities of sintered Al increased from 2.5397 to 2.575 g/cm^3 as the Sn content increased from 1.5 to 2.5 wt. % respectively. Accordingly, the physical characteristics of sintered Al were transformed from black to silver, which confirmed the reduction in the oxygen content (oxide layer reduction) from 0.58 to 0.44 wt. % respectively. Additionally, the microstructure of the resultant sintered Al demonstrated that effective wetting by Sn addition was obtained at its maximum content of 2.5 wt. % with a greater micro pores reduction and better metallurgical bonding between Al particles. Therefore, the introduction of different Sn content, along with Mg element, was found to further improve the sintering response of the resultant sintered Al that consequently improved its densities and physical characteristics.

Reaxys Database Information

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Indexed keywords

Engineering controlled terms: Liquid phase sintering | Magnesium | Manufacture | Metallurgy | Powder metallurgy | Sintering | Tin

Engineering uncontrolled terms: Aluminum (Al) | Combined effect | Metallurgical bonding | Oxide layer | Oxygen content | Physical characteristics | Powder metallurgy techniques | Sintering additives

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