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**Microstructure, mechanical and thermo-physical properties of Al–50Si–xMg alloys**

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**Abstract:** There is a growing demand to achieve better performance of electronic packaging materials owing to the development of modern electronics industry. In this work, the effects of elemental Mg addition on microstructural characteristics, mechanical properties, and thermo-physical properties of Al–50Si alloys were investigated. The tensile strength, bending strength, and hardness are improved significantly when the Mg content increases from 0% to 1%, but decreases as the content exceeds 1%. The enhanced strength is mainly attributed to the presence of small bar-like Mg<sub>2</sub>Si phase located at the interface. However, the extensive growth of Si phase in the high Mg contained alloys reduce the mechanical properties. The thermal conductivity and thermal expansion coefficient decrease gradually with the increase in the Mg content. Compared with the addition of Cu, minor amount of Mg addition (0.5%) can effectively increase the strength of Al–50Si alloys without substantially sacrificing the thermal conductivity.

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