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Quality control of microstructure in recycled Al-Si cast alloys

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Using recycled aluminium cast alloys is profitable in many aspects. Secondary aluminium produced from recycled metal requires only 2.8 kWh/kg of metal produced and creates only about 5 % as much CO_2 as by primary production. Improved mechanical properties of recycled (secondary) hypoeutectic Al-Si cast alloys are strongly dependent upon the distribution and the shape of the silicon particles; the morphology, type and distribution of the second phases, which are in turn a function of alloy composition and cooling rate. The presence of additional elements as Mg, Mn, Fe, or Cu allows many complex intermetallic phases to form, which make characterisation non-trivial. They are added deliberately to improve and to provide special material properties. Controlling the microstructure is, therefore, very important. A combination of different analytical techniques (light microscopy upon black-white etching; scanning electron microscopy (SEM) upon deep etching and energy dispersive X-ray analysis (EDX); quantitative phase analyse upon Image analyzer NIS Elements 3.0) were therefore been used for the quality control of microstructure in recycled AlSi9Cu3 cast alloy.

Keywords: recycled Al-Si cast alloys, microstructure, intermetallic phases

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