

Sintered Fe-Mo-Si-C alloys with ductile cast iron microstructure

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Sintered Fe-Mo-Si-C alloys, produced by admixing 4.0 wt.% silicon carbide to two different pre-alloyed powders with compositions of Fe-0.85Mo and Fe-1.5Mo, sintering at 1250°C for 45 minutes and cooling in a vacuum furnace, showed a microstructure similar to that of a ductile cast iron. The microstructure of the sintered alloys was characterized by the bull's eye structure consisting of a black particle surrounded by ferrite shell and harder shell of pearlite/bainite, respectively. With the influence of alloying element content in the pre-alloyed powders, the proportion of the harder shell, particularly the bainite fraction, increased with increasing molybdenum content. Due to the matrix hardenability via bainite formation by the molybdenum influence, tensile strength of the sintered alloys increased but elongation decreased with increasing molybdenum content.

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