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Sinter hardening hybrid alloyed PM steels based on Mo prealloyed powder

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Sinter hardening is an economically attractive and environmentally friendly way to improve strength and hardness of sintered steels. Because of the lower cooling rates compared to e.g. oil quenching, steel grades with improved hardenability are required. Here it is shown that sinter hardening behaviour can be attained at moderate alloy element contents when base powders prealloyed with low amounts of Mo are combined with Mn-Si masteralloys. The low starting oxygen content of these base powders alleviates the effect of "internal gettering", i.e. oxygen transfer from the base powder to the masteralloy particles, which otherwise would have an adverse effect on the properties. Sintering at temperatures >1200℃ yields optimum properties, but also at belt furnace temperatures below 1150℃ attractive combinations of hardness and impact toughness are attained.

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