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Abstract
The objectives of this work are to investigate the effects of silicon powder addition and sintering temperature on the sinterability , mechanical properties , corrosion and oxidation resistance of sintered 303LSC stainless steels. Influence of vibratory ball-peening on the corrosion and oxidation resistance is also studies. The sinterability , mechanical properties and corrosion resistance are increased with increasing amount of the silicon powder addition. The improvement is resulted from the increasing ferrite content induced by introducing of more silicon powder and the decreasing surface area of the well-sintered alloys. Cold work with vibrator ball-peening closed small surface pores and reduces the surface area profoundly. The oxidation resistance at 600℃ and 800℃ in air increases with increasing silicon powder addition. The oxidation resistance of sintered alloys at 600 ℃ is decreased by the treatment of vibrator ball-peening , but no appreciable degradation is found at 800℃.
Hard and brittle sigma phase precipitates when the sintered alloys are aged at 800℃ , the aging time varies 10 of 2000 minutes. The sigma phase precipitates when the aged times was over 10 minute. Morphology of the sigma phase depends on the aging times. Hardness and increased with increasing aging time , but the corrosion resistance and toughness was decreased.
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