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Thermodynamic simulation of phase formation in the Mo-Si alloys doped with yttrium

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Abstract

Thermodynamic simulation of the phase formation in Mo-Si hypoeutectic alloys when doping with yttrium was carried out. It was found that the usage of the values of the thermochemical characteristics of Mo_3Si and Mo_5Si_3 molybdenum silicides laid in HSC Chemistry 6.12 software database in the simulation of binary hypoeutectic Mo-Si alloys led to results, which contradict the Mo-Si phase diagram. It was determined that yttrium in the Mo-Si(5.0%)-Y(0-5.0%) ternary alloys can be found both in the form of yttrium silicides and in a metallic state. Their concentrations depend on the temperature and the amount of yttrium additive in the alloy. To retain the two-phase structure of the Mo-Si hypoeutectic alloys the amount of yttrium additive should be limited.