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新型FeMB系纳米晶软磁材料的成分设计

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摘 要：运用Miedema理论，系统计算Fe，B与Cu，Mo，Ni，Cr，V，Ga，Nb，Hf和Zr等元素形成合金系时的热力学性质。运用理想溶液理论，计算1 600 K时该二元合金系的过剩Gibbs自由能、过剩熵和活度。结果表明，在FeMB体系中，Fe-Zr-B的混合焓最小；1 600 K时Fe-M-B体系的过剩Gibbs自由能与其混合焓相似，其过剩熵趋近于零，活度相对于理想溶液偏差极小，在实际应用中可忽略不计。

关键字： FeMB纳米晶软磁材料；Miedema理论；热力学参数

Component design theory for new type of FeMB nanocrystalline soft magnetic materials

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Abstract: The mixing enthalpy of the alloy systems of Fe and B with Cu, Mo, Ni, Cr, V, Ga, Nb, Hf and Zr was calculated using Miedema theory. The excess Gibbs free energy, excess entropy and components activities at 1 600 K for FeMB alloy systems were calculated using the ideal solution model. The results show that the formation enthalpy of FeZrB alloy is the least among the above alloys systems. The excess Gibbs free energy is similar with the mixing enthalpy. The excess entropy of FeMB at 1 600 K approaches zero, and the activities curves show infinitesimal deviation from the ideal solution which can be neglected in practice

Key words: FeMB nanocrystalline soft magnetic alloy; Miedema theory; thermodynamic parameter

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