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Zn(II)-Glu²⁻-CO₃²⁻-H₂O体系热力学平衡分析

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摘 要: 针对碱式碳酸锌(2ZnCO₃·3Zn(OH)₂)在L-谷氨酸一钠溶液中的热力学行为, 根据配位化学理论绘制谷氨酸根(Glu²⁻)和碳酸根(CO₃²⁻)
在溶液中的形态分布图; 根据双平衡法理论研究Zn(II)-Glu²⁻-CO₃²⁻-H₂O体系中Zn(II)的配合平衡热力学, 并绘制L-谷氨酸一钠浓度在0~5
mol/L范围和pH在7~14范围内变化时的热力学平衡图, 研究L-谷氨酸一钠浓度、pH值和游离碳酸根离子浓度对L-谷氨酸一钠浸出碱式碳酸锌的影
响。同时对热力学计算结果进行实验验证。结果表明: 在一定的L-谷氨酸一钠浓度下, 当pH=10时, 溶液中总锌浓度达到最大值; 锌离子浓度理
论计算值与实验值之间相对误差的绝对平均值为11.39%。

关键字: L-谷氨酸一钠; 碱式碳酸锌; 浸出; 热力学

Thermodynamics equilibrium analysis of Zn(II)-Glu²⁻-CO₃²⁻-H₂O system

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Abstract: Thermodynamic behaviors of basic zinc carbonate(2ZnCO₃·3Zn(OH)₂) with L-monosodium glutamate solution were studied. Species distribution diagrams of glutamate (Glu²⁻) and carbonate ion(CO₃²⁻) in the solution were obtained based on the coordination chemistry theory. Thermodynamics of Zn(II) complex equilibrium in the system of Zn(II)-Glu²⁻-CO₃²⁻-H₂O were studied based on the double equilibrium theory. When the concentration of L-monosodium glutamate and pH value varied accordingly in ranges of 0~5 mol/L and 7~14, the equilibrium thermodynamic diagrams were constructed, and the effects of L-monosodium glutamate concentration, pH value and free carbonate ion concentration on leaching of basic zinc carbonate were also studied. The results show that the total zinc concentration reaches the maximum value when

the pH value is 10 under a certain L-monosodium glutamate concentration. The absolute average value of relative error between the theoretical calculation and experimental results is 11.39%.

Key words: L-monosodium glutamate; basic zinc carbonate; leaching; thermodynamic

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