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$20CaO·13Al_2O_3·3MgO·3SiO_2$的合成与氧化铝的浸出性能

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摘 要： 使用分析纯试剂配料，在1 500 ℃、保温1 h的条件下得到了四元化合物$20CaO·13Al_2O_3·3MgO·3SiO_2$ ($C_{20}A_{13}M_3S_3$)，研究了其氧化铝浸出性能，并通过XRD和SEM等分析了其在碳酸钠溶液中的作用机理。结果表明：$C_{20}A_{13}M_3S_3$具有一定的氧化铝浸出能力，其浸出率随着浸出时间的延长而提高，并在浸出2 h后达到最大值68.87%，低于同条件下$12CaO·7Al_2O_3$的氧化铝浸出率(92.78%)；$C_{20}A_{13}M_3S_3$和Na_2CO_3反应的主要产物为$NaAl(OH)_4$和$CaCO_3$，并含有少量的Ca_2SiO_4和$Mg(OH)_2$；生成的Ca_2SiO_4具有较高的活性，浸出2 h后，其分解率可达到19.35%。

关键字： 铝酸钙炉渣；MgO；$C_{20}A_{13}M_3S_3$；氧化铝；浸出

Synthesis and Al_2O_3 leaching property of $20CaO·13Al_2O_3·3MgO·3SiO_2$

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Abstract: $20CaO·13Al_2O_3·3MgO·3SiO_2$ ($C_{20}A_{13}M_3S_3$) was obtained at 1 500 ℃ for 1h with analysis pure reagents proportioning. Alumina leaching property of $C_{20}A_{13}M_3S_3$ was studied. And the mechanism of the reaction between $C_{20}A_{13}M_3S_3$ and Na_2CO_3 solution was discussed by XRD and SEM method. The results indicate that alumina can be leached from $C_{20}A_{13}M_3S_3$. The leaching rate rises gradually with the prolongation of leaching time and reaches its maximum 68.87% after leaching for 2 h. The maximum leaching rate of $C_{20}A_{13}M_3S_3$ is lower than that of $C_{12}A_7$, which is 92.78% under the same condition. The main products of $C_{20}A_{13}M_3S_3$ reaction with Na_2CO_3 are $NaAl(OH)_4$ and $CaCO_3$, and a few amount of Ca_2SiO_4 and $Mg(OH)_2$ are also generated. Ca_2SiO_4 generated from the reaction has high activity, and the decomposition rate can achieve 19.35% after leaching for 2 h.

Key words: calcium aluminate slag; MgO; $C_{20}A_{13}M_3S_3$; alumina; leaching

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