



论文摘要

中南大学学报(自然科学版)

ZHONGNAN DAXUE XUEBAO(ZIRAN KEXUE BAN)

Vol.32 No.3 Jun.2001

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文章编号: 1005-9792(2001)03-0251-04

Na_2WO_4 溶液结晶过程中除砷、硅等杂质

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摘要: 以机械活化碱分解黑白钨混合中矿及常压碱煮钨渣所得高杂粗钨酸钠溶液($m(\text{As})/m(\text{WO}_3)=(0.32-2.94) \times 10^{-3}$, $m(\text{Si})/m(\text{WO}_3)=(1.26-5.84) \times 10^{-3}$)为原料进行钨酸钠结晶过程除砷、硅等杂质的研究, 分析了结晶率及氧化铝的添加量对除杂效果的影响. 试验结果表明: 除杂效果与结晶率有关, 当结晶率为80%~90%时, 除砷率和除硅率均可达90%以上, 对 $m(\text{As})/m(\text{WO}_3)$ 和 $m(\text{Si})/m(\text{WO}_3)$ 分别为 3.21×10^{-4} 和 2.41×10^{-3} 的料液而言, 除杂后的精液中 $m(\text{As})/m(\text{WO}_3)$ 和 $m(\text{Si})/m(\text{WO}_3)$ 可分别降至 3.50×10^{-5} 和 3.56×10^{-4} 以下. 添加 Al_2O_3 可明显改善结晶过程中的除杂效果, 且 Al_2O_3 经化学改性处理后, 活性增强, 除杂效果更好; 在相同条件下, 与不加铝盐相比, 添加活性 Al_2O_3 可使精液中的杂质含量明显降低, 除砷率由88.48%增加到94.65%, 除硅率由89.77%提高至97.74%.

关键字: 钨酸钠; 结晶; 除杂

Removal of arsenic and silicon from sodium tungstate solution by crystallization

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Abstract: The removal of arsenic and silicon from impure Na_2WO_4 solution was investigated by crystallization using the liquors ($m(\text{As})/m(\text{WO}_3)=0.32 \times 10^{-3} \sim 2.94 \times 10^{-3}$, $m(\text{Si})/m(\text{WO}_3)=1.26 \times 10^{-3} \sim 5.84 \times 10^{-3}$) from middle-grade mixed wolframite and scheelite concentrate decomposed with NaOH by mechanical activation and tungsten residue leached by traditional digestion. The influences of the crystallization ratio and the addition of Al_2O_3 on removing impurities of As and Si were investigated. It was concluded that the results of removing impurities are related with the crystallization ratio of sodium tungstate and higher than 90% of removal ratio of arsenic and silicon can be obtained under the conditions of 80%~90% of Na_2WO_4 crystallizing ratio. High quality Na_2WO_4 solution can be reached and the values less than 3.50×10^{-5} form $m(\text{As})/m(\text{WO}_3)$ and 3.56×10^{-4} form $m(\text{Si})/m(\text{WO}_3)$ in the pure Na_2WO_4 solution can be obtained for the impure Na_2WO_4 solution containing 3.21×10^{-4} of $m(\text{As})/m(\text{WO}_3)$ and 2.41×10^{-3} of $m(\text{Si})/m(\text{WO}_3)$. It was also found that the addition of aluminum oxide can improve the process and better results can be obtained when

Al₂O₃ was activated by chemical method. Under the same conditions the removal ratio of arsenic and silicon can be increased from 88.48% to 94.65% and from 89.77 % to 97.74 respectively compared with no Al₂O₃ addition.

Key words: sodium tungstate; crystallization; removing impurities

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