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## 从负载铅的DNNSA-P204煤油溶液中反萃铅

## Back-extraction of lead from lead-loaded DNNSA-P204 kerosene solution

关键词: [二壬基萘磺酸](#) [二\(2-乙基己基\)膦酸](#) [反萃](#) [铅](#) [废水](#)基金项目: [国家自然科学基金项目\(No.51209024\)](#); [四川省教育厅资助科研项目\(No. 15ZA0189\)](#)

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摘要: 研究了从二壬基萘磺酸-二(2-乙基己基)膦酸(DNNSA-P204)负载有机相中反萃铅的影响因素,考察了反萃剂种类、反萃时间、反萃温度、反萃剂浓度和反萃油水比( $V_O/V_A$ )对负载有机相中铅反萃的影响.实验结果表明,硝酸为最佳反萃剂,反萃平衡的时间为5 min,低温有利于反萃.反萃过程为放热过程,过程焓变为 $-942.7 \text{ J} \cdot \text{mol}^{-1}$ .广角激光光散射和FT-IR结果表明:DNNSA浓度不变时, DNNSA-P204形成的混合反胶团随着P204浓度的增加而变大,负载有机相中的铅以PbAD形式增溶进入混合反胶团内水相中.经多次反萃后,萃取剂DNNSA-P204对铅仍有较好的萃取能力.当反萃时间为5 min,温度为298 K,油水比为2:1,硝酸浓度为 $0.6 \text{ mol} \cdot \text{L}^{-1}$ 时,反萃率可达到70%.

**Abstract:** The influencing factors on the back-extraction of lead from lead-loaded dinonylnaphthalene sulfonic acid-di(2-ethylhexyl) phosphonic acid (DNNSA-P204) kerosene solution were investigated. The effects of stripping agents, stripping time, temperature, stripping agent concentration and phase ratio( $V_O/V_A$ ) were determined. It was found that the most suitable stripping agent was nitric acid, and the equilibrium was attained in 5 min. Low temperature had a positive effect on the back-extraction of lead ions. The enthalpy of activation  $\Delta H$  was calculated to be  $-942.7 \text{ J} \cdot \text{mol}^{-1}$ , indicating that the extraction of Pb (II) was exothermic reaction in the investigated system. Wide angle laser light scattering and FT-IR spectra results confirmed that the size of the DNNSA-P204 reverse micelles increased with the adding of the P204 concentration when the DNNSA concentration kept constant, promoting the solubility of Pb (II) in organic phase into inner water pools as PbAD. The extraction-stripping cycles of Pb (II) were repeated and the results showed that the stripping agent nitric acid was promising. DNNSA-P204 reverse micelles solution could be repeatedly used for the extraction of Pb (II) from waste water. Under optimal operation conditions with back-extraction time of 5 min, back-extraction temperature of 298K, phase ratio ( $V_O/V_A$ ) of 2:1, and nitric acid concentration of  $0.6 \text{ mol} \cdot \text{L}^{-1}$ , the yield of back-extraction can reach 70%.

**Key words:** [Dinonylnaphthalene sulfonic acid](#) [Di\(2-ethylhexyl\)phosphonic acid](#) [Back-extraction/Stripping](#) [Lead](#) [Wastewater](#)

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