

题目：磷化液废水处理（重点除镍）研究

**Treatment of Phosphating solution Wastewater (removal
of Ni)**

摘要

将铁件浸入到热的稀磷酸溶液中，铁件表面就会生成一层致密氧化膜就是磷化，但这种膜的保护性较差，因此通常会在磷酸中加入锌、锰、镍等金属离子以及亚硝酸盐、氟盐等，这样使磷化液组成变得复杂，排出液有害物质多。因此磷化液废水是现代工业严格管控的污染物。同样，磷化液废水处理成为重点监测目标。磷化液处理主要有强碱中和法、石灰法、一体化处理等，每种方法都有其特点与不足。

本文针对生产中的磷化液废水，采取收回其中的盐，使水中各种指标达到排放要求为目标，做到有用物质循环利用，减少生产企业的污水处理压力。实验中，对回收的磷化液采取先过滤净化，再经提浓，然后采取萃取结晶分离，获得磷化液中的结晶混合物，再经处理，获得一定纯度的镍盐等。实验结果表明,在 70 度时无水乙醇对硫酸镍的回收率最大为 57.4%，在 50 度时丙酮对硫酸镍的回收率最大为 59.3%。

该工艺特点：占地小，集成自动化程度高，稳定性强，无需专人值守；出水水质优，可达到排放标准；污泥产量小；建设周期短，土建工程量小；综合建设成本低，可以回收镍盐实现循环利用节约资源。

关键词：磷化液 磷化液废水 废水处理 萃取结晶 排放标准

ABSTRACT

When iron parts are immersed in hot dilute phosphoric acid solution, a dense oxide film is formed on the surface of iron parts, which is called phosphating. However, the protective property of this film is poor. Therefore, zinc, manganese, nickel and other metal ions, nitrite and fluoride are usually added into phosphoric acid, which makes the composition of phosphating solution complicated and causes more harmful substances in the discharge liquid. Therefore, phosphating liquid wastewater is a strictly controlled pollutant in modern industry. Similarly, the treatment of Phosphating Wastewater has become a key monitoring target. Phosphating solution treatment mainly includes strong alkali neutralization, lime method, integrated treatment, each method has its own characteristics and shortcomings.

In this paper, in view of the phosphating liquid wastewater in production, we take the recovery of salt in the wastewater to meet the discharge requirements of various indicators in the water, so as to achieve the recycling of useful substances and reduce the pressure of wastewater treatment in production enterprises. In the experiment, the recovered phosphating solution was filtered and purified first, then enriched, and then separated by extraction and crystallization to obtain the crystalline mixture in the phosphating solution, and then treated to obtain a certain purity of nickel salts. The experimental results show that the maximum recovery of nickel sulfate from anhydrous ethanol is 57.4% at 70 degrees and 59.3% from acetone at 50 degrees.

The process features: small area, high integration automation, strong stability, no need for dedicated duty; excellent effluent quality, can meet discharge standards; small sludge production; short construction cycle, small amount of civil engineering; low cost of comprehensive construction, can recycle nickel salt to achieve recycling and resource saving.

Key words: Phosphating liquid and phosphating liquid wastewater treatment, extraction and crystallization discharge standard

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