Niti Poowanathai 2003: Recovery of Silver as Silver Nitrate from Silver Chloride and Photographic Process Wastes. Master of Science (Chemistry), Major Field: Inorganic Chemistry, Department of Chemistry. Thesis Advisor: Assistant Professor Apisit Songsasen, Ph.D. 95 pages.
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Various methods for the recovery of silver as silver nitrate from waste silver chloride based on the reduction of silver chloride by reducing agents, high temperature procedure and electrolysis are described. Comparisons for the %yield, %purity and cost of operation among these methods have also described. The actual yield and the purity of the recovered-silver nitrate are in the range of 27.68-97.33% and 21.57-99.55%, respectively. The reduction of silver chloride with K_2CO_3 at 1000 °C in electric furnace give the highest yield and purity which equal to 97.33% and 99.55%, respectively. The operation cost was compared and the reduction of silver chloride by formaldehyde was the lowest cost method.

For the recovery of silver from photographic process waste, a new chelating resin containing substituted 4-(2′-benzothiazolylazo)-3,5-dimethylpyrazole (BTADMP) as functional group, which can adsorb silver(I) has been prepared and used. The new synthesis pathway, spectroscopic characterization and complex formation with silver(I) of BTADMP are described. BTADMP forms complex with silver(I) in the ratio of 1:1 in dichloromethane solution at pH 7. The synthesis, adsorption ability toward silver(I) as a function of pH of the new chelating resin (P-BTADMP) are also described. The distribution coefficient of the P-BTADMP for metal ions such as silver(I), palladium(II), platinum(IV), gold(III), chromium (III), zinc(II), nickel(II), lead(II), cadmium(II) and copper(II) at pH 4 were 0.4005, 0.4522, 0.1874, 0.2476, 0.0484, 0.0126, 0.0713, 0.0032, 0.0800 and 0.0104, respectively. The P-BTADMP has higher selectivity toward precious metal ions compared with Amberlite IR-120. P-BTADMP can be used to separate silver(I) from pre-electrolyzed photographic process solution. Desorption of silver(I) from P-BTADMP is effected by extracting with 6 molar nitric acid.

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