

RECOVERY OF VALUABLE SUBSTANCES

ABSTRACT

Valuable substances are recovered from a spent  
5 electroless nickel plating solution containing a water-  
soluble nickel salt, organic complexing agent,  
hypophosphite, phosphite, and alkali metal ion by adding  
oxalic acid to the plating solution for causing a nickel  
ion to precipitate as nickel oxalate for removal and  
10 recovery; optionally adding a sulfide to the plating  
solution for causing a heavy metal ion to precipitate as a  
heavy metal sulfide for removal; adding a mineral acid and  
calcium oxide, calcium hydroxide, calcium carbonate,  
calcium sulfate, calcium chloride or a calcium salt of  
15 organic acid to the plating solution from which the nickel  
ion has been removed; firing solids of the solution in air  
for converting the alkali metal ion into an alkali metal  
salt of mineral acid, converting phosphorus into  
hydroxyapatite, and pyrolyzing off the organic material;  
20 and pouring a solid mixture of the alkali metal salt of  
mineral acid and hydroxyapatite into water for dissolving  
the alkali metal salt of mineral acid in water for separate  
recovery of hydroxyapatite and the alkali metal salt of  
mineral acid.