

Gold Removal and Recovery

The use of ion exchange resins to recover gold from plating operations is extremely efficient and simple in operation.

ResinTech's strongly basic anion exchange resins (ResinTech SBG1 or ResinTech SBG2) have a high affinity for the gold cyanide complex and can be loaded with as much as 120 troy ounces of gold per cubic foot of resin. This allows for an easily operated and economically attractive process for gold recovery.

The rinse waters from gold plating operations in the electronics industry and in jewelry manufacturing contain low concentrations of gold due to "drag-out". The concentrations of gold are too low for efficient recovery by electro-chemical and plating-out methods. These traces of gold can be recovered efficiently by means of ion exchange which concentrates the trace levels of gold for re-use.

In order to obtain the maximum utilization of the resin's capacity, it is best to use two resin beds in series. The gold concentration is monitored between the first and second resin beds. This way, the first column of resin can be run until it is fully saturated with gold. The second column is then moved into the primary position and a fresh resin bed introduced into the exhausted column, which is then brought back on-line as the polishing unit.

The gold is physically recovered from the resin by incinerating the spent resin. The incineration of the resin can be carried out by precious metal recovery companies at a cost equal to a small percentage of the overall value of the gold. The cost of incineration and replacement of the resin is about the cost of one ounce of gold. Since the capacity of the resin bed can be as high as 120 ounces of gold per cubic foot, the potential is for 99% yield on an economic basis.

Certain base metals, such as copper, nickel, cobalt, and zinc, form anionic complexes with strong affinities for the strongly basic resins. When these are present they will compete with the platinum group metals for the ion exchange sites thus reducing the yield. Other anions such as chlorides and sulfates can also compete for ion exchange sites but have a much smaller effect than the metal anionic complexes. ResinTech SBG1 will give high yield with other platinum group metals in similar operating conditions. The yield of metals will be proportional to gold when adjusted for the difference in the atomic weights.

In the recovery of gold from "acid gold" baths and similar solutions (where the platinum group metals are held in solution by citric acid or other organic acids or chelating agents) the ratio of gold bearing ions to the complexing ions can be much lower than in cyanide based solutions. This reduces the gold capacity to only a few ounces per cubic foot, unless a selective resin (ResinTech SIR-400) with higher affinity for the gold ions is used.

ResinTech SBG1 or ResinTech SBG2 are suitable for these applications. If a higher yield is desired, ResinTech SIR-400 can provide a several fold increase in operating capacity, up to 80 ounces per cubic foot in all operating conditions. Although ResinTech SIR-400 is quite a bit more expensive than these other products, this is more than offset by the increased operating capacity in otherwise unfavorable conditions.

