Concurrent application of reverse osmosis and vacuum evaporation for the recycle of electroplating wastewater

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Electroplating facilities generate large volumes of wastewater, which contain a wide spectrum of metals as well as various plating chemicals. Electroplating wastewater is subject to ever-stricter effluent standards and the sludge from conventional wastewater treatment is also highly regulated. Therefore, the plating industry is under increasing pressure to move toward developing the measures to recover metals and chemicals from plating waste stream and to recycle purified water from spent rinsewater. Evaporation is the oldest and most broadly applied technology for recovery in the plating industry. Although evaporation is more energy intensive than other separation methods, it is a straightforward, rugged and reliable recovery technique. After evaporation, reverse osmosis has the longest operating history in plating industry. Reverse osmosis is a relatively mature technology and uses considerably less energy than evaporation for the same rinsewater feed rate.

In this work, a case study is performed to develop a recycle process for the treatment of electroplating wastewater based on a concurrent application of vacuum evaporation and reverse osmosis. An alkaline noncyanide copper-plating process is selected as an objective system. Fig. 1 shows the schematic diagram of the recycle process investigated. The effects of the system design parameters and operating conditions on the process performance will be discussed.

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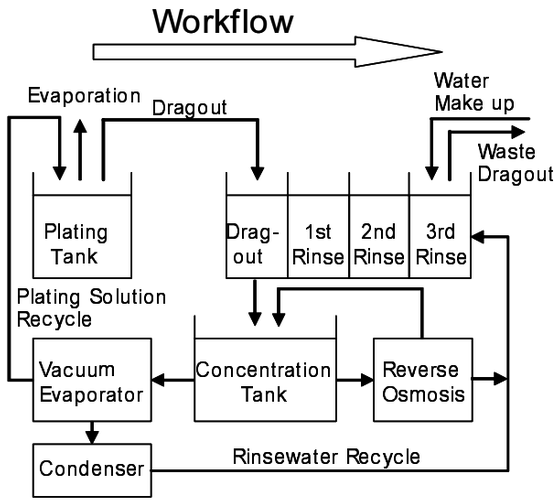

Fig. 1. Schematic diagram of a recycle process for an alkaline noncyanide copper-plating based on a concurrent application of vacuum evaporation and reverse osmosis.