Nickel-Chromium Focus

Presentation NC6

Studies on Eliminating Aerosol Emissions from Electroplating Tanks

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Emission of hexavalent chromium from electroplating tanks during hard chrome plating operations is a major occupational hazard for workers. Chromium emission is mainly the result of aerosols that are formed by the impingement of air bubbles at the chromic acid liquid surface. While there are previous studies on aerosol generation resulting from the bursting of gas bubbles at a gas-liquid interface, there are no systematic model and experimental studies on the aerosol size distribution and its total mass. In this paper, a new mathematical model capable of predicting the aerosol size distribution as a function of gas bubble diameter will be presented, as well as results of its validation with experimental data. The aerosol characteristics will be used to estimate the risk posed to workers during chromium electroplating. Standard electroplating operations, aerosol generation rates and risk assessment will be compared with a novel electroplating process that eliminates aerosol generation by a second liquid phase floating on the surface of the chromic acid liquid.

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