

Design of sulfuric acid regeneration system using batch vacuum distillation

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In this work, sulfuric acid regeneration system is designed. Using batch distillation, sulfuric acid is concentrated under low pressure made by vacuum pump. Also contained are the degrees of freedom of the batch vacuum distillation system and methodologies of the simulation of batch system by means of steady state model.

Optimal design is obtained for each feed conditions. An important parameter, capacity of the vacuum pump, was introduced and studied. The result is that as feed concentration is low or temperature is high, the vacuum pump should be operated slowly due to the bubble point effect. Unless controlled low enough, a large amount vapor would be generated imposing a heavy duty on the condenser. On the other hand, if the feed concentration is high or temperature is low enough to avoid the bubble point during the pump operation, it is better to decrease the pressure as quickly as possible in terms of the yield.

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