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Modeling of Sulfuric Acid Condensation on Heat Exchanger Cooling Fins XIAOBAI LI, DAVID COOK, Robert Bosch LLC Research and Technology Center-North America — Sulfuric acid corrosion on metallic heat exchanger cooling fins can cause serious blockage problem and stop the normal operation of heat exchangers. Corrosion rates are strongly dependent on surface film pH value. Therefore, a multi-physics computational framework was developed to predict the liquid film formed on solid surface and the pH distribution. Such a model can be used for better understanding of acid condensation from multi-species system. In this work, first, from S to H_2SO_4, formation of sulfuric acid in gas phase during combustion and cooling process was investigated with detailed chemistry mechanisms. The amount of SO_2 and SO_3 that plays important role in acid condensation process was calculated. Then, multi-component condensation process was modeled to produce a liquid film of acid and water solution condensed on solid surface that has low temperature. pH value was obtained based on the concentration of the acid. The above work provides critical information for corrosion analysis for heat exchangers.

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