

Abstract Submitted  
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**Impacts of Transport Properties of Porous Corrosion Product Layer on Effective Corrosion Rate** XIAOBAI LI, DAVID COOK, Bosch Research and Technology Center North America — Condensing exhaust gases containing  $\text{H}_2\text{O}$ ,  $\text{SO}_3$  and  $\text{NO}_x$  cause serious corrosion failure in various industry processes. For example, in modern compact heat cells, corrosion products deposit on top of the heat exchanger cooling fins, blocking the flow passages and drastically decreasing system performance. The transport properties of porous corrosion product layers play important role in determining the corrosion tendency and observed corrosion rate. To understand the corrosion mechanism for Aluminum alloy in sulfuric acid environment, impacts of transport properties of corrosion residual layers are investigated with different numerical models for porous layer diffusivity. The effective corrosion rates resulted from these models are compared to corresponding experimental measurements. A multilayer diffusivity model in which diffusivity depends both on porous layer structure and composition shows excellent agreements with experimental data. This model is currently being used in a multi-scale flow simulation framework to predict corrosion phenomena in heat cells.

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