Classical statistical methodology for accelerated testing of Solid Oxide Fuel Cells

Solid Oxide Fuel Cell (SOFC) lifetime prognosis is a substantial challenge for market introduction. This paper illustrates an accelerated testing approach based on an extensive quantity of experimental degradation data and suggests derivable degradation quantities for SOFC with focus on a large number of tests. The semi-empirical degradation models are based on the underlying physical degradation phenomena in the cell and are used for projection of temperature and steam impact on SOFC aging. Degradation tests performed at seven different temperatures and four different p(H2O) in the fuel gas are used for evaluation. The key contribution of this study is parameterization of the aging model by experimental data while physical simulations in literature usually lack such robust empirical foundation.

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