

## Improving the Performance of Proton Exchange Membrane Using Fuzzy Logic

**Authors :** Sadik Ata, Kevser Dincer

**Abstract :** In this study, the performance of proton exchange membrane (PEM) fuel cell was experimentally investigated and modelled with Rule-Based Mamdani-Type Fuzzy (RBMTF) modelling technique. Coating on the anode side of the PEM fuel cell was accomplished with the spin method by using Yttria-stabilized zirconia (YSZ). Input-output parameters were described by RBMTF if-then rules. Numerical parameters of input and output variables were fuzzificated as linguistic variables: Very Very Low (L1), Very Low (L2), Low (L3), Negative Medium (L4), Medium (L5), Positive Medium (L6), High (L7), Very High (L8) and Very Very High (L9) linguistic classes. The comparison between experimental data and RBMTF is done by using statistical methods like absolute fraction of variance (R2). The actual values and RBMTF results indicated that RBMTF can be successfully used for the analysis of performance PEM fuel cell.

**Keywords :** proton exchange membrane (PEM), fuel cell, rule-based mamdani-type fuzzy (RMBTF) modelling, Yttria-stabilized zirconia (YSZ)

**Conference Title :** ICESD 2016 : International Conference on Energy and Sustainable Development

**Conference Location :** Paris, France

**Conference Dates :** May 16-17, 2016