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**عنوان مقاله:**

Multi-physics mathematical modeling of solid oxide fuel cells with micro-structurally graded anode electrode

**محل انتشار:**

چهارمین کنفرانس هیدروژن و پیل سوختی (سال: 1396)

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**خلاصه مقاله:**

This research presents a combined micro-scale and macro-scale mathematical model to study the effect of various micro-structurally graded anode electrode on the system output indices. Porosity and particle sizegraded structures are considered for this purpose. A multi-physics mathematical model is developed which considered the coupled effect of mass transport and electrochemistry in the porous electrodes.Multi-component dusty gas model is adopted to predict concentration of species gases at the triple phase boundaries. In addition, a percolation theory is used to model electrode effective properties. The proposedmodel verified using graded button cell experimental data. The obtained results reveal that the cell performance improves for particle size grading electrode with just one active layer. On the other hand,two layer porosity graded anode shows less overpotential compared to the one layer and non-graded cases

**کلمات کلیدی:**

Graded; Multi-physics; Micro-structural; Percolation theory; Dusty gas model

**لینک ثابت مقاله در پایگاه سیویلیکا:**

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