（6月23日）教育部"节能与环保汽车创新引智基地"报告系列

时间：2010年6月23日 14:00-15:30

地点：新能源汽车工程中心308会议室

报告人：孙澎涛博士(Assistant Professor)

研究单位：Dept. of Mathematical Sciences, University of Nevada Las Vegas

主持人：周苏 教授

报告题目：A new formulation and an efficient numerical technique for a nonisothermal, anisotropic, two-phase transport model of PEMFC

报告摘要：In this topic, a new formulation and an efficient numerical technique are preliminarily studied for a nonisothermal, anisotropic, two-phase transport model of PEMFC, where flow, species, charge and energy equations are all addressed. The importance of water and temperature management are investigated in the anisotropic and nonisothermal point of view. Due to the employment of multi-phase mixture (M2) model, the diffusivity of water transport presents the significant discontinuity and degeneracy across the interface of single gas phase region and two-phase region. In addition, the

distinct discontinuity of water diffusivity also emerges through the membrane. Such discontinuities and degeneracy of water diffusivity challenge the fast convergence of nonlinear iteration in numerical simulation, showing oscillating and even divergent iteration process. Based on an intensive new formulation of M2 model for PEMFC, an efficient numerical technique, Kirchhoff transformation, is specifically employed in order to overcome such numerical difficulties and achieve fast and convergent simulation. Numerical experiments are implemented accordingly to indicate the efficiency of the presented numerical technique, in contrast to the oscillating iterations without new numerical technique.

新能源汽车工程中心

2010 年 6 月 17 日

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