1110-65-92 **Yuzhou Sun**, **Pengtao Sun**, **Bin Zheng*** (bin.zheng@pnnl.gov) and **Guang Lin**. *Error analysis of finite element method for Poisson-Nernst-Planck equations.*

A priori error estimates of finite element method for time-dependent Poisson-Nernst-Planck equations are studied in this work. We obtain the optimal error estimates in $L^\infty(H^1)$ and $L^2(H^1)$ norms, and suboptimal error estimates in $L^\infty(L^2)$ norm, with linear element, and optimal error estimates in $L^\infty(L^2)$ norm with quadratic or higher-order element, for both semi- and fully discrete finite element approximations. Numerical experiments are also given to validate the theoretical results. (Received February 12, 2015)