1056-62-1564 **Ming Ye*** (mye@fsu.edu), 400 Dirac Science Library, Department of Scientific Computing, Florida State University, Tallahassee, FL 32306. *Groundwater Reactive Transport Modeling under Uncertainty.*

Groundwater environmental systems are open and complex, in which intricate biological, physical, and chemical processes occur and interact at multiple scales. Groundwater reactive transport modeling is entailed for understanding and predicting the system responses to natural forces (e.g., climatic) and human activities (e.g., contaminant remediation and CO2 sequestration). The modeling results are critical for effectively managing groundwater contamination and for providing a scientific basis for decision making. However, uncertainty is one of the greatest obstacles to groundwater reactive transport modeling. It is well known that uncertainties are large in characterization and description of the groundwater system. This study is focused on quantifying uncertainty in describing uranium sorption. Based on the surface complexation theory, a total of seven geochemical models are postulated with different degrees of complexity. These models are evaluated using the breakthrough data of three column experiments, and their predictive performance is investigated using the breakthrough data of four column experiments. The study manifests importance of addressing model structure uncertainty in groundwater reactive transport modeling. (Received September 22, 2009)