OPTIMIZATION OF REACTION PARAMETERS FOR MICROWAVE DRIVEN HETEROGENEOUS CATALYSIS. Kyle Serniak, Mark Ray Crosswhite, A.E. Stiegman, Department of Chemistry, Florida State University, 95 Chiefton Way, Tallahassee, FL 32306

Microwave chemistry is gaining popularity due to increased reaction rates, lowered reaction temperatures and improved energy efficiency of reactions under microwave conditions compared with traditional thermal processes. By carefully selecting reaction vessels and solvents, one can selectively heat a catalyst within the vessel instead of first heating the vessel, solvent, reagents and then the catalyst.

The temperature of the bulk solution is not representative of the microwave-absorbing heterogeneous catalyst. Unfortunately, the temperature at the catalytic sites is what determines whether the required activation energy is present. Here we use derived thermodynamic differential equations to determine the relationship between the temperature of the bulk solution and that of the catalytic sites. This relationship, which illustrates the fundamental principles of thermodynamics as they apply to a microwave specific reaction system, must be understood in order to optimize microwave driven catalysis and shed light on the controversy surrounding the ‘microwave effect’.