1135-76-1908 **Jeffrey K Landgren*** (jeffrey.landgren@ung.edu) and **Gerhard Strohmer** (gerhard-strohmer@uiowa.edu). *An Acoustic Eigenvalue Problem and Its Application to Electrochemistry.*

Recent experiments in the field of Electrochemistry demonstrate that sound waves act as a catalyst for chemical reactions. A model is developed using conservation of momentum and mass, a boundary motion equation, and a surface tension equation. Chemically, it is clear that the catalytic phenomenon is derived from the sound waves and how they are affected by the top boundary. When combining all four equations we arrive at a boundary condition involving the top boundary only. Throughout the problem a self-adjoint invertible operator derived in the top (Neumann) boundary condition is established. Then a discussion ensues regarding regularity and formalizing all other boundary and initial conditions. These conditions will then be applied to the wave equation for later use in the model. The specific chemical reactions where this phenomenon is observed can be found in batteries, capacitors, and solar cells. The reaction takes place at an interface or boundary in each device. Making these devices more efficient can help decrease our negative impact on the environment. (Received September 25, 2017)