

University of South Alabama

JagWorks@USA

Poster Presentations

Honors College

5-2024

Enabling More Efficient Solar Thermal Energy Production and Storage

Allan Wilson

Follow this and additional works at: https://jagworks.southalabama.edu/honors_college_posters



Part of the [Environmental Chemistry Commons](#), [Oil, Gas, and Energy Commons](#), [Other Chemistry Commons](#), and the [Other Environmental Sciences Commons](#)

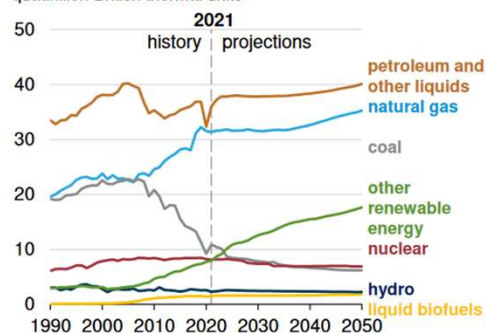
Enabling More Efficient Solar Thermal Energy Production and Storage

Allan C. Wilson,¹ Marshall D. Manning,¹ Dr. James H. Davis, Jr.,² Dr. Brooks D. Rabideau,¹ and Dr. Kevin N. West¹

¹Department of Chemical & Biomolecular Engineering, ²Department of Chemistry, University of South Alabama, Mobile, AL

INTRODUCTION

Energy consumption by fuel
AEO2022 Reference case
quadrillion British thermal units



- Concentrated Solar Power (CSP) stores & transfers energy using a Thermal Energy Storage Fluid (EIA AEO 2022)

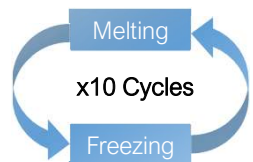
MATERIALS AND METHODS



All samples were run using differential scanning calorimetry (DSC) on a TA DSC 2500.

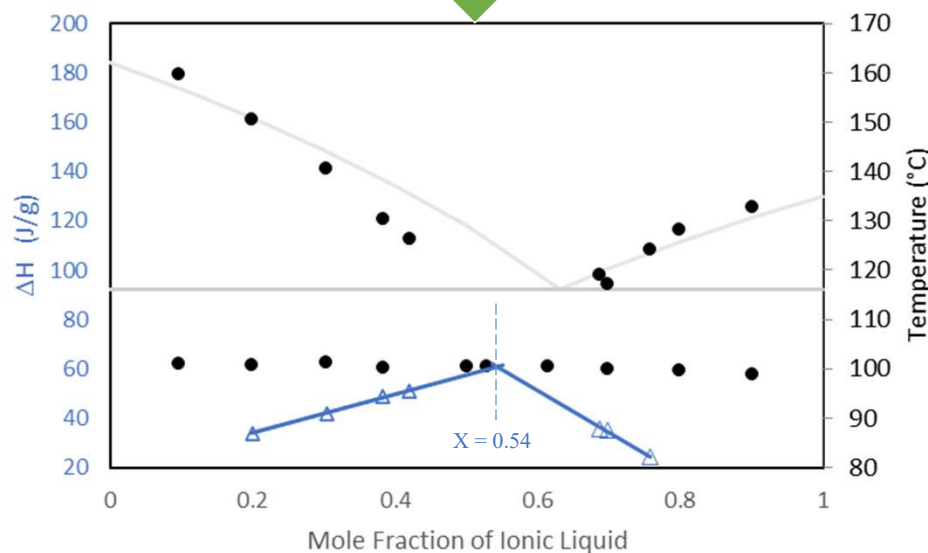
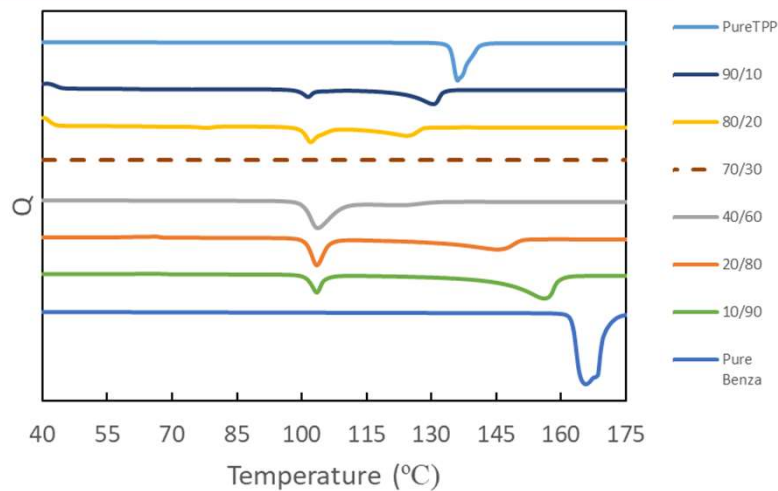


1 Fully Mix Sealed Samples via:



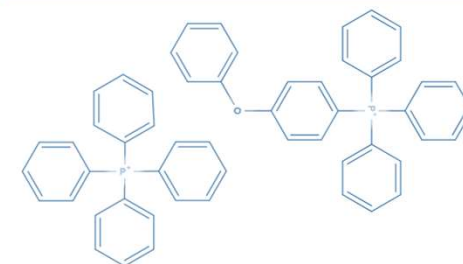
2 Average Next 5 Cycles for Results

RESULTS



Significantly decreased melting temperature was found by combining TPP bistriflimide with behaviorally similar compounds

FUTURE WORK



- Evaluation of other tetraarylphosphonium based cations
- Exploration of structure / property relationships of compounds for multiple use cases

REFERENCES



FUNDING

- South Alabama Office of Undergraduate research
- Department of Energy (DoE) - Award DE-SC0020282
- Sponsored by the Office of Science & Office of Advanced Manufacturing through DOE EPSCoR Program

U.S. DEPARTMENT OF ENERGY Energy Efficiency & Renewable Energy
ADVANCED MANUFACTURING OFFICE

U.S. DEPARTMENT OF ENERGY Office of Science

USA
UNIVERSITY OF SOUTH ALABAMA