



SAND2018-3769PE

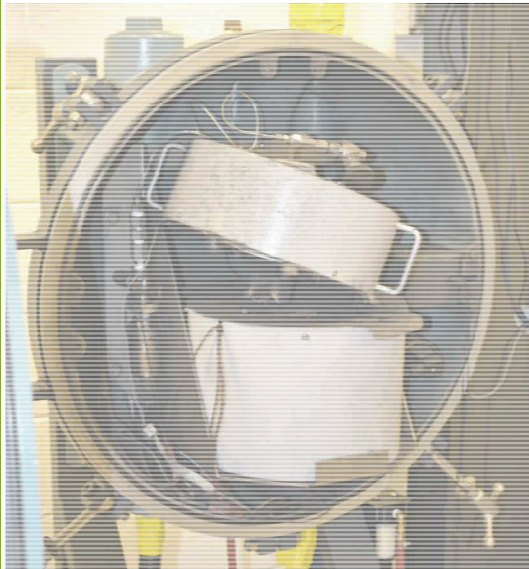


# SNL INPUT

# ABUSE RESPONSE OF SILICON ANODES

## Previously presented data

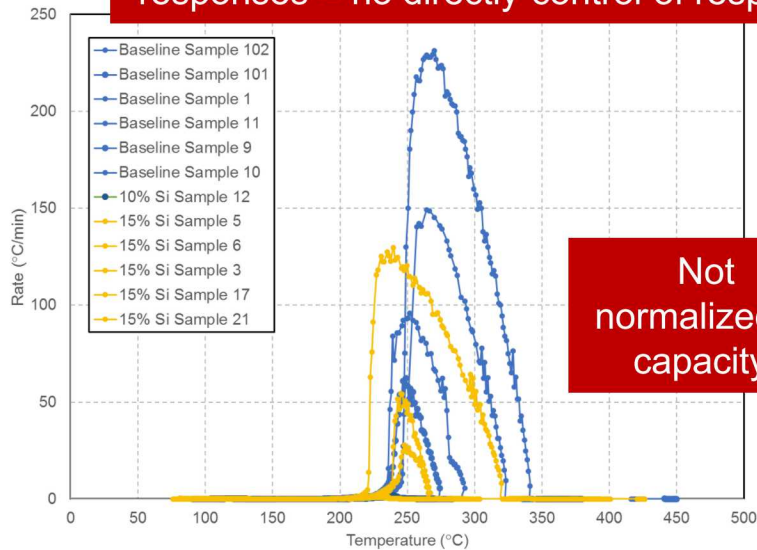
Complete rupture for entire ARC system seen with nano silicon electrodes at both 10 and 15% Si (both ARCs same result) – only a few instances of this occurring in SNL abuse testing



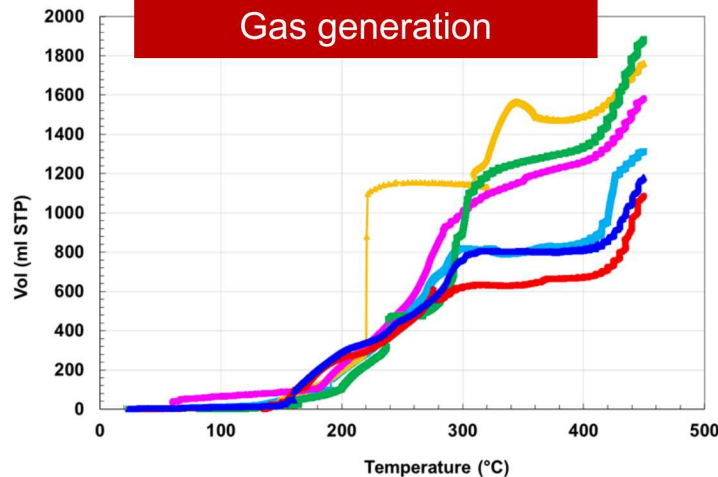
DPA analysis for cells show no indication of manufacturing defects. Results suggest energetic runaway is attributed to chemical decomposition.

# ARC EVALUATIONS

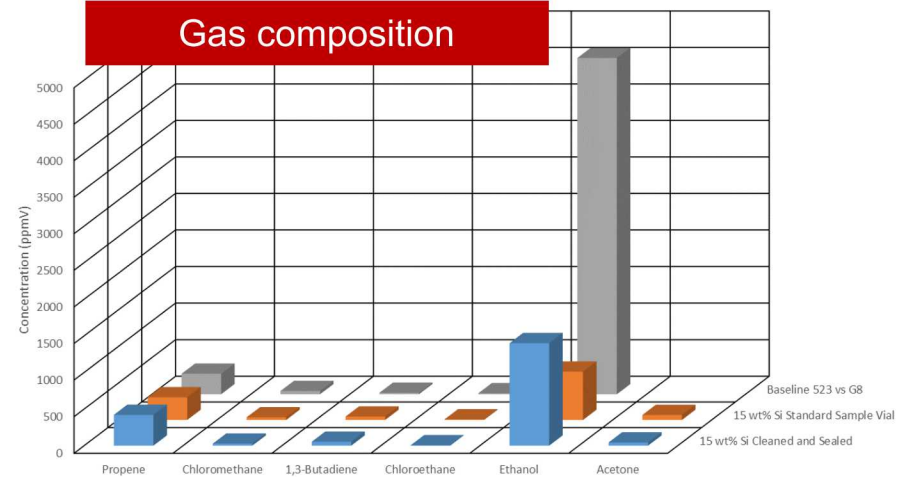
Small capacity cells exhibit varying responses – no directly control of response



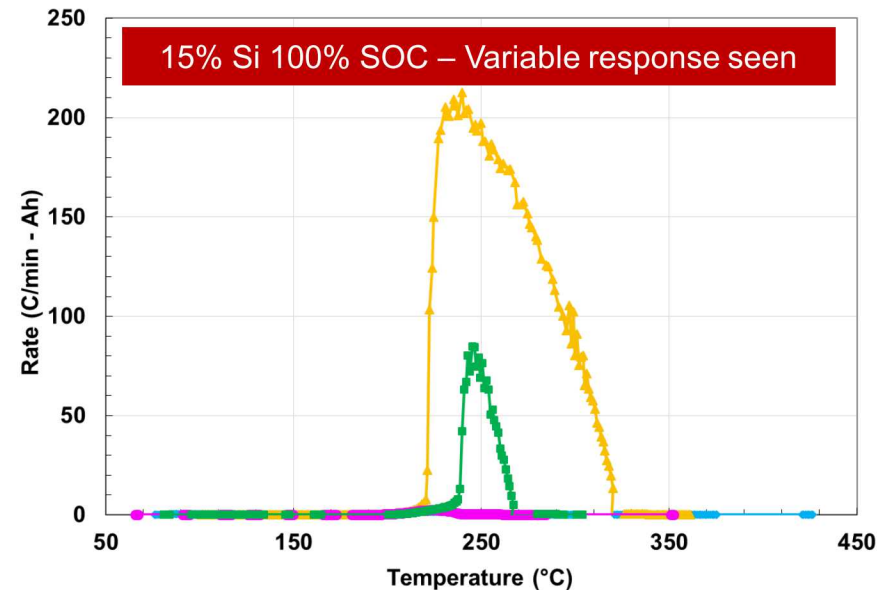
Not normalized to capacity!



## Gas composition



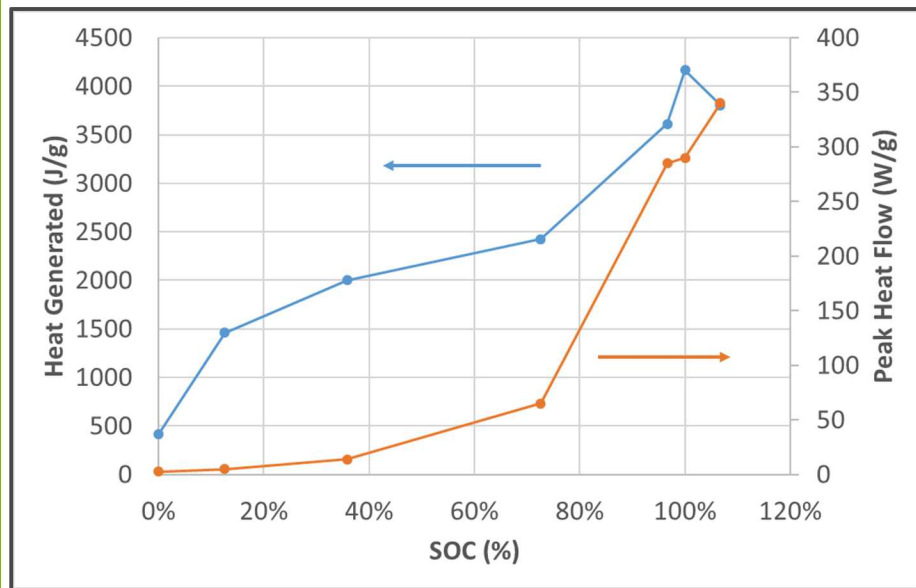
## 15% Si 100% SOC – Variable response seen





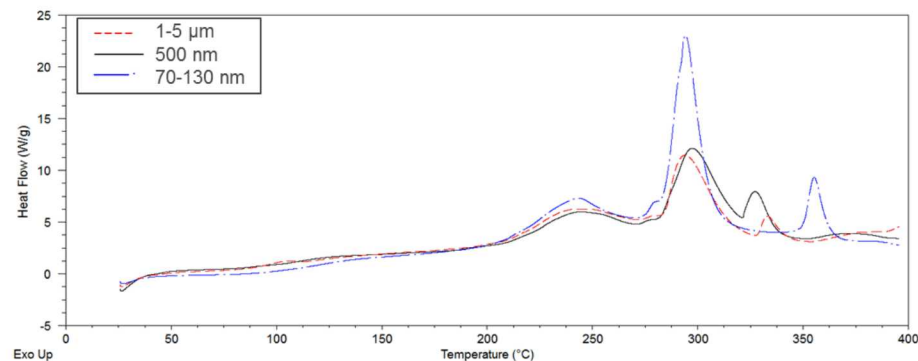
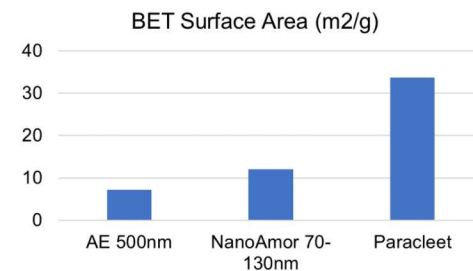
# CALORIMETRIC ELECTRODE CHARACTERIZATION

## Heat generation and peak heat flow trends with various parameters

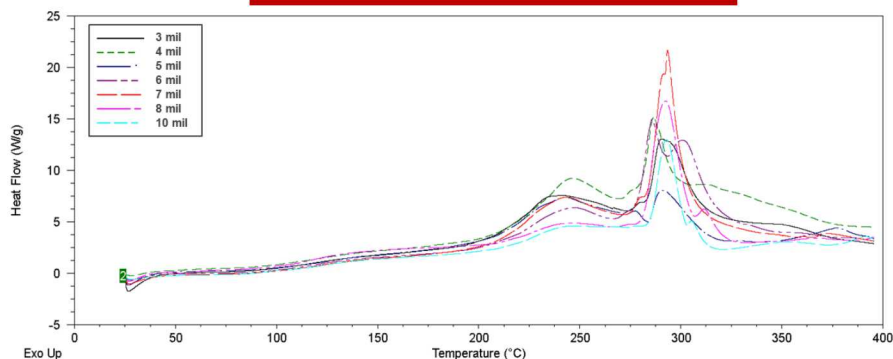


### Particle Size

| Particle Size | Heat Generation (J/g) | Peak Heat Flow (W/g) |
|---------------|-----------------------|----------------------|
| 1-5 μm        | 1364                  | 11.4                 |
| 500 nm        | 1430                  | 12.1                 |
| 70-130 nm     | 2377                  | 23.0                 |



### Electrode Thickness



Half cell v lithium  
70-130nm Nanoamor silicon  
46 % coating porosity  
15% nSi  
78% MAG-E  
2 % Timcal C45  
10 % LiPAA

