

Breakout Session 2:

Thermal Intensification- High Temperature Processes

Technology Needs, Barriers, & Challenges

- Understand material characteristics at high temperatures via modeling & measurement,
- Develop materials w/ multiple properties that can withstand harsh environments
 - E.g., corrosion resistance; very high temps
- Model cost and physical characteristics when scaling-up a process
- New technologies
 - Selective / targeted heating
 - Microwave & plasma heating
 - Efficient heat exchangers
 - Sensors
- New process design for alternative with low/no thermal needed

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R&D Needs

- New industrially robust materials development
 - Energy & Heat capture / insulation / control
 - High heat gradient
- New material modeling & characterization
 - E.g., multi-physics models, thermal dynamic properties
- Scale-up of advanced thermal technologies
- New hardware development
 - Sensors
 - Reactors
 - Heat exchangers
 - Large-scale, high-frequency equipment
- New process control
 - Algorithms, non-contact measurement, etc

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Metrics and Impacts

- Cost
 - Capital, material, operation, maintenance, throughput, logistic, etc
- Energy intensity / efficiency / productivity
- Safety
- Modularity & production flexibility
- Footprint
- Value added
- Return on Investment (ROI)
- Environmental impact

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Role of a Public Private Partnership

- Cross industry technology development & opportunities
 - Testbeds for pilot demonstrations
 - Lessons-learned
 - Expand beyond core capabilities
 - Exposure to new customer segments, trends, etc.
- Resource for small / medium size companies
- Workforce development
 - Teaching factory