ADDITIVELY MANUFACTURED sCO₂ POWER CYCLE HEAT EX. FOR CSP 08737

Novel Binderjet HX enables 5¢/kWh CSP cost

1. Impact
   - Develop high performance, low-cost additive HX enabling $900/kW, sCO₂ power block and 5 ¢/kWh CSP plant
   - Cost reduction by $175/kWe (0.9 ¢/kWh)

2. Project Goal
   - Develop Binderjet process for a compact HX design with complex features
   - High efficiency core design enabling 50% volume and material reduction
   - Modular HX to result in low cost sCO₂ power cycle recuperator

3. Method(s)
   - Binderjet process dev. & core design to meet performance goals
   - Create and model modular HX design
   - Sub-scale HX performance test (ΔP/P, UA)
   - Cost modeling, final HX design & Tech2market

4. Outcome(s)
   - Build control (±0.25mm Dn, ±0.2mm wall, Ra<17μm) demonstrated
   - Modular HX with integrated manifold built & sintered
   - HX tests - ΔP/P <2%, UA > 2.6E6 W/°C
   - Estimates demonstrate recuperator cost < 90% Weiland model

5. Conclusion/Risks
   - Low-cost, high-performance sCO₂ power cycle recuperators help meet 2030 SETO CPS plant cost goals making CSP competitive
   - Subscale HX tests to validate ‘UA’ and ‘ΔP/P’ estimates

6. Team
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