Thermodynamic and Kinetic Investigation of a Chemical Reaction-Based Miniature Heat Pump
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Objective
Explore use of chemical heat pumps for electronics cooling applications

Approach
- Investigate two reversible chemical reactions
- Simulate heat pump cycle based on operating temperatures and equilibrium limitations
- Quantify reactor sizes

Results
- Closed-loop pervaporation required to exceed equilibrium limitations and achieve sustainable loop
- Required reactor sizes may be most appropriate for large systems (i.e. data center cooling)

\[C_6H_{12}O_3 + \Delta H \leftrightarrow 3CH_3CHO\]

Selected Publications