

Impact of Refrigerant Leaks from Zeotropic Refrigerant-Based Refrigeration System

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Performance Characterization and Fractionation of Refrigerants

- Improper system design optimization of high-glide refrigerant-based systems
- Refrigerant charge optimization for critically charged system
- Effect of high-glide refrigerant leakage in centralized refrigeration system and critically charged system
- Selection of low-GWP solutions for commercial refrigeration industry

Fractionation Study

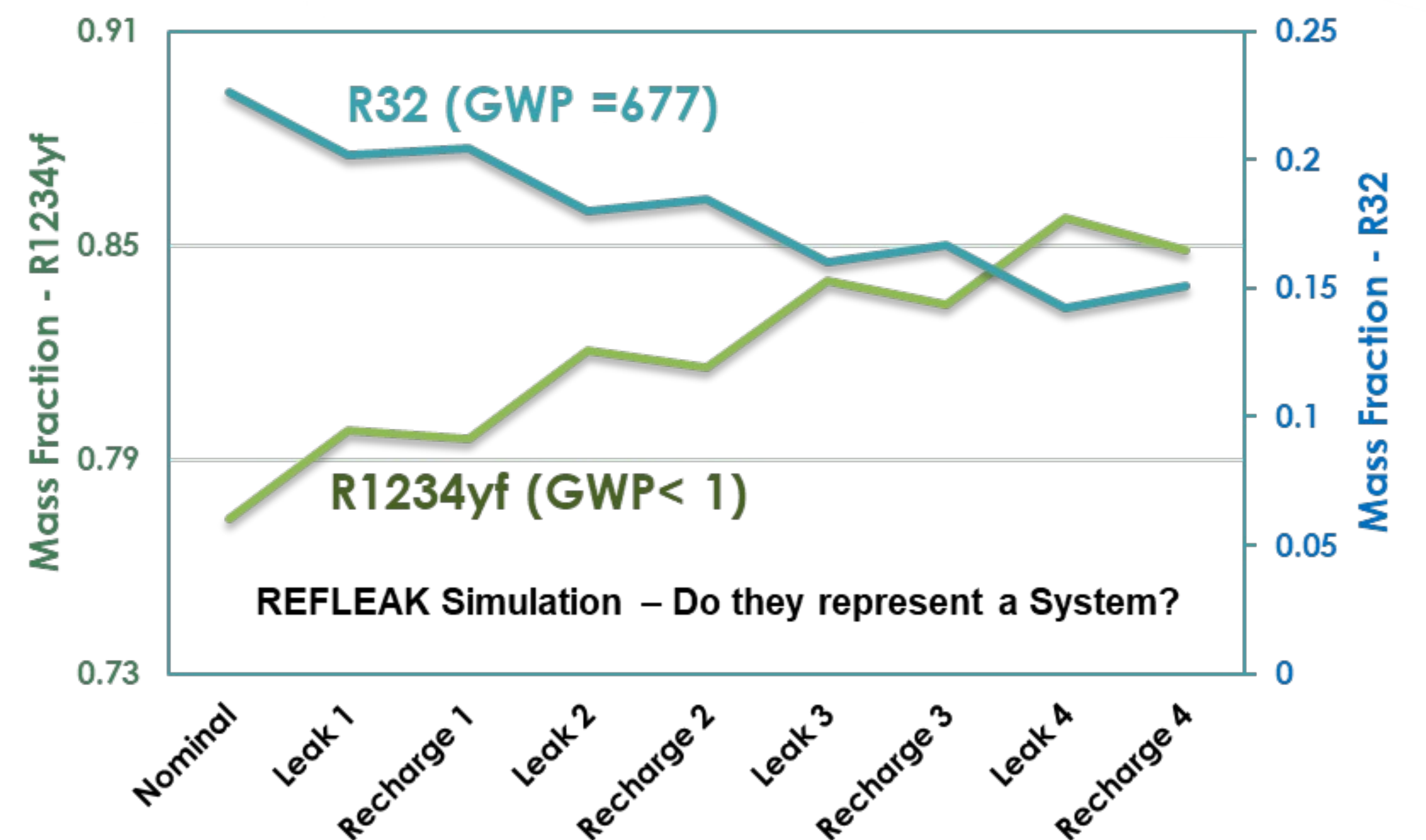
- Fast vs. slow leaks during operation and off cycle
- Two-phased leak on high- and low-pressure sides
- Three to four leak/recharge events to study performance measurements between events
- Fractionation detection tool development
 - Chromatic transformation
 - Infrared /Nondispersive Infrared and Metal oxide semiconductor based handheld gas analysis tool

Simulation and Experiments Study

- Condenser oversizing—subcooling
- Evaporator/Thermal expansion valve superheat
- Compressor sizing/selection
- Head pressure setting

Impact

- Reduced greenhouse gas emissions
- Lower manufacturing and maintenance costs



Operating Conditions used for R-404A (benchmark), R-454C and R-455A					
Outdoor Temp		Box temperatures			
		Low Temperature		Medium Temperature	
		°C	°F	°C	°F
°C	°F	-26	-15	2	35
24	75	Performance		Performance	
35	95	Performance + Leak Study		Performance	
43	110	Performance		Performance	

