Beyond Extraction: Using a Supercritical CO2 Platform for Nanoparticles, Heat Pumps, and Micro Turbines

Infinity Turbine LLC

[TEL]

[Email] greg@infinityturbine.com

https://www.infinityturbine.com/sco2-for-nanoparticle-production-and-heat-pumps-by-infinity-turbine.html

A supercritical CO2 extraction platform can do far more than botanical oils and e waste. Discover how the same high pressure system can be used for nanoparticle processing, chiller and heat pump testing, micro Brayton cycle turbines, and other imaginative phase change applications.

This webpage QR code

PDF Version of the webpage (maximum 10 pages)

Beyond Extraction: Using a Supercritical CO2 Platform for Nanoparticles, Heat Pumps, and Micro Turbines

1. Introduction: From extractor to supercritical CO2 laboratory
Most people see a supercritical CO2 machine and think extraction. But structurally, what you really have is:
1. High pressure vessels and piping.
2. Precision pressure and temperature control.
3. CO2 circulation, often with pumps, valves, and heat exchangers.
4. Monitoring for flow, pressure, and temperature.
In other words, you already own:
• A small, controllable supercritical CO2 test loop.
With minor modifications, this same platform can be used to study:
• Nanoparticle formation and coating.
• Pressure reduction and performance for chillers and heat pumps.
• Micro supercritical CO2 turbines and Brayton cycle experiments.
• Phase change behavior, tribology, and thermal management.
The marketing message shifts from extraction machine to “multi purpose sCO2 process and energy lab” that can attract customers in materials science, HVAC, energy, and aerospace.

2. Application 1: Nanoparticles and functional materials in supercritical CO2
Supercritical CO2 is an exceptional medium for making and manipulating nanoparticles. It can act as:
• A solvent,
• An antisolvent,
• A carrier, or
• A deposition medium.
2.1 Supercritical antisolvent precipitation
One well known method is supercritical antisolvent precipitation. You:
1. Dissolve a solute (for example, a polymer or drug molecule) in an organic solvent.
2. Introduce this solution into supercritical CO2.
3. CO2 changes the solubility conditions and forces the solute to precipitate as fine particles.
By controlling:
• Pressure,
• Temperature,
• Flow and mixing,
you can influence particle size, morphology, and distribution.
Potential markets:
1. Pharmaceutical and nutraceuticals
• Nano sized active ingredients for enhanced bioavailability.
• Controlled release formulations.
2. Functional inks and coatings
• Conductive nanoparticle dispersions.
• Pigments with precise optical properties.
3. Advanced additives
• Nano fillers for polymers and composites

Copyright 11/12/20 Infinity Turbine LLC

Using a Supercritical CO2 Platform for Alternative Applications

What if your extraction system was actually a complete supercritical CO2 laboratory for the future of energy and materials? With the right instrumentation, a plant oil or e waste extractor can become a testbed for nanoparticles, advanced chillers and heat pumps, and even micro supercritical CO2 turbines. This article explores how to repurpose and market the same hardware as a multipurpose sCO2 R and D platform.

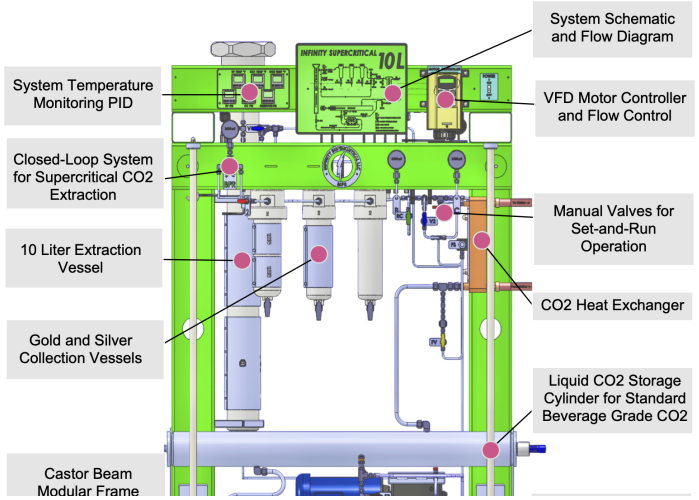
Using a Supercritical CO2 Platform for Alternative Applications

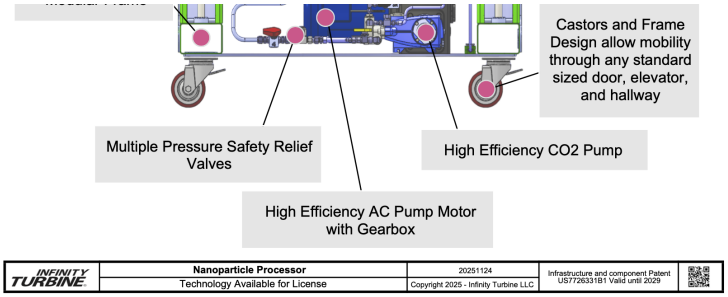
What if your extraction system was actually a complete supercritical CO2 laboratory for the future of energy and materials? With the right instrumentation, a plant oil or e waste extractor can become a testbed for nanoparticles, advanced chillers and heat pumps, and even micro supercritical CO2 turbines. This article explores how to repurpose and market the same hardware as a multipurpose sCO2 R and D platform.

Copyright 11/12/20 Infinity Turbine LLC

Infinity Turbine LLC

Silver and Gold Nanoparticle Process Production Closed Loop Supercritical CO2 System





Copyright 11/12/20 Infinity Turbine LLC