

Hello.

Please find below the ways our system is unique:

The Frac Vap Process is **unique** for the following reasons:

1. This process operates at subcritical water temperature. Subcritical water extraction is a brand-new separation technology. This allows it to be able to be of substantial value for many new industries for solvent and water, which include:
 - a. Subcritical water extraction (SWE) - a green process that can use water as solvent for extracting bioactive compounds. SWE is a new and powerful technique at temperatures between 100 and 374oC and pressure high enough to maintain the liquid state (Fig.1) [4]. Unique properties of water are namely its disproportionately high boiling point for its mass, a high dielectric constant and high polarity. As the temperature rises, there is a marked and systematic decrease in permittivity, an increase in the diffusion rate and a decrease in the viscosity and surface tension. In consequence, more polar target materials with high solubility in water at ambient conditions are extracted most efficiently at lower temperatures, whereas moderately polar and non-polar targets require a less polar medium induced by elevated temperature more info.
 - b. Extraction of flavonoid molecules;
 - c. Extraction and solvents for the medical field;
 - d. Plant medicine and plant extraction
 - e. Effective separation for separations
 - f. New drug developments
 - g. Purification and extraction of phytochemicals
 - h. Thermal regeneration of activated carbon;
 - i. Removal of inorganic and organic sulfur compound;
 - j. conversion of south african coals to liquid and gas products;
 - k. Oil shale extraction and oil recovery;
 - l. Subcritical liquid extraction from bio materials;
 - m. Macroporous resin manufacturing and regeneration;
 - n. Sub-Supercritical CO2 extraction technology;
 - o. Sub-Supercritical fluid extraction.

2. The process is not based on coagulation or flocculation of particles. Our process keeps the molecules apart because of the valence charge and the negative charge of the added chemicals. The salts then do not stick or adhere to the heat exchanger surfaces whatsoever.
3. Our process is not a batch process. Our system is a continuous supply of a very usable product.
4. Since our system operates at a high temperature, almost all organic substances and salts can be removed.
5. The processed energy is a 100 percent sensible heat exchange system. This energy is recovered with 75% of the energy saved.
6. This process desalinates fluids from the level of sea water (35,000 mg/l) to the level of flowback or fracking fluid (300,000 mg/l.)
7. The process removes all the salts, the carbonates and the bicarbonates.

After reviewing the "similar" patents you provided, we have assembled disputes regarding our similarity to these other patents. There are several statements below to do this, and I will both provide the statement, and will explain the difference between said patent and our system.

US8529155B2:

- This process uses reverse osmosis and salt distillation.
 - Our process uses chemicals and is based on thermodynamic properties, which is a completely different process from theirs.
- "Like your invention, this invention discloses a similar method of precipitating desired products and collecting clean water from a mixture. This is done by using a combination of reagents and heating to reach the desired pH and temperature settings at different stages of the process."
 - Our system does not precipitate in the reactor at all. Precipitation occurs when a substance, organic or inorganic, falls out of a solution due to the weight and mass.
 - Our separation is based on the chemical and thermodynamic reactions at a super-heated state of water. At these temperatures, we rely on the excessive changes in the hydrogen bonding action of the molecules. This is completely different from their system. They can precipitate out a small fraction of the sodium while we extract all the sodium. We are operating slightly below the triple point of water and they are not.

US6623603B1:

- "Like your invention, this invention discloses a method of super-heating a mixture to extract clean water and impurities."
 - The like invention heats the water to create steam, which is used for their system process. Our system does not use steam in our system process.
- "Unlike your invention, this invention does not disclose the same method nor the use of necessary reagents to precipitate insoluble salts."
 - This process uses steam. Ours does not rely on steam whatsoever. Our liquid remains liquid and never transforms to steam. Our process uses chemicals and thermodynamics.

US9902652B2:

- The process used in this patent is lime softening. It is a process invented by the Chinese people about 20,000 years ago. Lime softening is a water treatment process that uses calcium hydroxide, or limewater, to soften water by removing calcium and magnesium ions. In this process, hydrated lime is added to the water to raise its pH level and precipitate the ions that cause hardness.
 - Our process uses chemicals and is based on chemicals and thermodynamic properties. It does not utilize a lime softening method.

A method and system which desalinates brackish water, sea water, and the returning fracking fluid. It can also be used during the fracking process itself by utilizing chemical thermodynamic conditions of the fluid at sub-critical temperature levels. It is very versatile and can be used for almost all industries from the oil and gas business, to the chemical processing industry, and it can even be utilized in the medical and pharmaceutical fields.