

ABSTRACT

Water with Switchable Ionic Strength

- A method and system for reversibly converting water between an initial ionic strength and an increased ionic strength, using a switchable additive, is described. The disclosed method and system can be used, for example, in distillation-free removal of water from solvents, solutes, or solutions. Following extraction of a solute from a medium by dissolving it in water, the solute can then be isolated from the aqueous solution or “salted-out” by converting the water to a solution having an increased ionic strength. The solute then separates from the increased ionic strength solution as a separate phase. Once the solute is, for example, decanted off, the increased ionic strength aqueous solution can be converted back to water having its original ionic strength and reused. Switching from lower to higher ionic strength is readily achieved using low energy methods such as bubbling with CO₂, CS₂ or COS.
- Switching from higher to lower ionic strength is readily achieved using low energy methods such as bubbling with air, heating, agitating, introducing a vacuum or partial vacuum, or any combination or thereof.

[Figure 21]