290o Removal of Arsenic (V) from Water Using Cationic Amphiphilic Molecules and Ultrafiltration Membrane: Effects of Amphiphile, Initial Arsenic (V) Concentration, Membrane Type and Membrane Pore Size, and Existing Co-Ions

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Due to its long-term toxicological and carcinogenic effects, the maximum contaminant level (MCL) of arsenic in drinking water was recently reduced from 50 ppb to 10 ppb by USEPA. By 2006, all public water suppliers (54,000 water systems in the United States) are required to maintain arsenic concentrations at or below the new MCL. However, the removal of arsenic is often unattainable to a satisfactory level through conventional separations based on adsorption or chemical precipitation. Therefore, rate governed separation processes, like membrane filtration, are rapidly replacing the adsorption based processes. The present research investigates the removal of arsenic (V) by ultrafiltration (UF) and amphiphilic aggregates. The effect of amphiphile, initial arsenic (V) concentration, membrane type and membrane pore size, and existing co-ions (carbonate, phosphate, silicate and sulfate) on the removal of arsenic (V) were studied. Results showed that the addition of amphiphilic molecules significantly increases the arsenic (V) removal efficiencies. The existing coions of carbonate, phosphate and silicate do not decrease the removal efficiencies regardless of the initial arsenic concentration. However, arsenic removal efficiencies decrease in the presence of high concentration sulfate ions and high initial arsenic concentrations.