Graduate Student Recruitment and Training Support

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Precipitation of arsenate with copper(II) in the presence of cationic polyelectrolyte

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Polyelectrolyte-enhanced ultrafiltration (PEUF) can achieve 99.95% removal of arsenate from solutions with initial arsenate concentration of 100 ppb, thereby easily meeting the new 10 ppb drinking water standard. For the process to be economically competitive, the polymer must be recovered from the retentate for recycle to the PEUF feed. One promising method for recovering the polyelectrolyte is addition of divalent metal ion (eg. Cu^{2+}) to precipitate the arsenate ions. The adsorption of poly(diallydimethylammonium chloride) (QUAT) on $NaCu_6(AsO_4)_4Cl{\cdot}4H_2O$ particles increases with increasing polymer concentration, decreasing ionic strength, and decreasing copper to arsenate ratio. The average particle size decreases with increasing polymer concentration, increasing salt concentration, decreasing temperature, and decreasing copper to arsenate concentration ratio. The sedimentation rate of the crystals increases with increasing polymer concentration, increasing electrolyte concentration, and increasing temperature. The viscosity of the supernatant solution increases with increasing polymer concentration, decreasing ionic strength, decreasing temperature, and decreasing copper to arsenate concentration ratio.

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