Arsenic treatment from wells water by galvanostatic electrocoagulation method

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ABSTRACT

The removal of arsenic from simulated wells water was carried out by galvanostatic electrocoagulation (GEC) method using CT3 steel as anode material. The influences of several parameters such as current densities, electrolysis time, charge density and initial arsenic concentrations as well as the relationship of oxidation ratio between As(III) and Fe in GEC were studied. The optimum current density by GEC was 2 mA cm⁻² at which the residual arsenic concentration in solution from initial arsenic concentrations of 251 ppb was smaller than WHO limit value (10 ppb) after 15 min. It could remove arsenic in wells water from concentration up to over 800 ppb and the residual arsenic concentration was less than 10 ppb. The maximal adsorption capacity was found 64.52 mg g⁻¹. The arsenic adsorption in GEC fitted well into the pseudo second-order model, where the equilibrium adsorption capacity decreased powerly with increase of current density, but, it increased linearly with the initial arsenic concentration. The oxidation ratio of As(III) to iron was significantly decreased until only iron was going on oxidized at the end of GEC process.

Keywords: Galvanostatic electrocoagulation; Simulation of arsenic contaminated wells water; Arsenic removal; CT3 steel electrode