

Title: Zero-valent iron impregnated cellulose acetate mixed matrix membranes for the treatment of textile industry effluent.

Author/Authors: Saranya R., Arthanareeswaran G., Ahmad Fauzi Ismail, Dionysios D. Dionysiou, Diby Paul

Abstract: Novel green synthesized zero valent iron (ZVI) nanoparticles of distinct mass fractions of 0.5, 1.5 and 2.5 wt% are blended with cellulose acetate (CA) to prepare CA/ZVI mixed matrix membranes (MMMs). The thermal stability and roughness were improved by increasing the mass fraction of ZVI in CA. The morphology of the prepared CA/ZVI membranes has been studied using transmission electron microscopy (TEM). Pure water permeability (PWP) is increased when adding 0.5 wt% of ZVI nanoparticles. When 2.5 wt% is added, PWP decreased due to the aggregation of ZVI nanoparticles in the CA polymer matrix. The adsorption capacity of ZVI nanoparticles on the CA/ZVI membrane during polymer enhanced ultrafiltration of textile effluent is also investigated. The equilibrium adsorption isotherms are well fitted with the Freundlich model, implying the influence of active adsorptive sites of the ZVI nanoparticles.