POLYPROPYLENE MICROPLASTICS REMOVAL USING FE BASED ELECTRODE VIA ELECTROCOAGULATION METHOD

NORFAEZATUL ALYSA BINTI OTHMAN

BACHELOR OF CHEMICAL ENGINEERING (ENVIRONMENT) WITH HONOURS

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By

NORFAEZATUL ALYSA BINTI OTHMAN

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ABSTRACT

With the gradual increase of pollution of MPs in the world, it is important to implement various method for removing MPs from water environment. In this study, polypropylene microplastics (PPMPs) removal from artificial wastewater using Fe electrode via electrocoagulation (EC) was investigated. Modified Fe electrode was prepared by anodization method in the electrolyte containing EG and NH_4F with presence of air bubbles at 60 V for 30 min at room temperature. For PPMPs removal, the concentration of 125 μm size of PPMPs used in this study was controlled at 125 and 250 ppm. The performance of Fe and modified Fe electrodes was evaluated for PPMPs removal based on their removal efficiency measured using turbidity meter. It was found that the 88.19% and 88.44% of PPMPs removal was achieved at at 90 min EC time using modified Fe electrode for 250 and 125 ppm of initial MPs respectively. Furthermore, using the linearity between the turbidity value of aggregation of PPMPs and EC time, the sedimentation rate after the coagulation/sedimentation process could be determined. The kinetics data were best fitted to pseudo first-order kinetics model with the sedimentation rate of reaction 0.0174 min^{-1} for modified Fe electrode indicating a improved removal rate of 250 ppm of PPMPs. Our findings imply that turbidity monitoring can offer reasonable optimization of water treatment techniques for successful removal of MPs.