

THE APPLICATION OF ACTIVATED PERSULFATE PROCESSES TO REDUCE WATER POLLUTION

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Water is important resource to all living organisms and for several human activities. Nevertheless, the issue of enhanced water contamination from various anthropogenic sources is continuous and needs well-developed alleviation aids. In the recent decade, purification of aqueous matrices from a wide range of organic pollutants is being increasingly performed by activated persulfate ($S_2O_8^{2-}$) treatment [1,2]. The activation of persulfate by transition metals, heat, alkaline pH, hydrogen peroxide or UV irradiation generates highly reactive species, sulfate radicals ($SO_4^{\bullet-}$), that are responsible for the oxidative degradation of organic pollutants [1].

In the current study, different persulfate activation methods were applied for phenolic wastewater, municipal landfill leachate and artificially contaminated groundwater, secondary treated wastewater and ultrapure water purification in lab-scale. The results indicated that this advanced oxidation technology could be viable pre-treatment step for high-strength wastewaters for a subsequent biological treatment. The experiments conducted in groundwater and secondary treated wastewater proved that the neutral pH region and subsequently, the formation of non-soluble ferric hydroxocomplexes during oxidation as well as the inhibiting properties of inorganic ions in these matrices could cause a decrease in the process efficacy. The most promising persulfate activation method could be the combination of ferrous iron and chelating agents or UVA irradiation. In addition, the nature of these activators contributes to the sustainable water processing technology.

References

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