

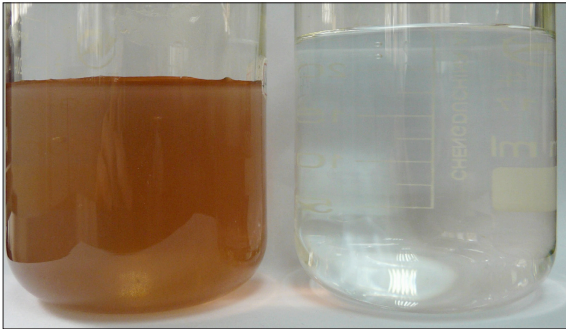


Igor Mojic

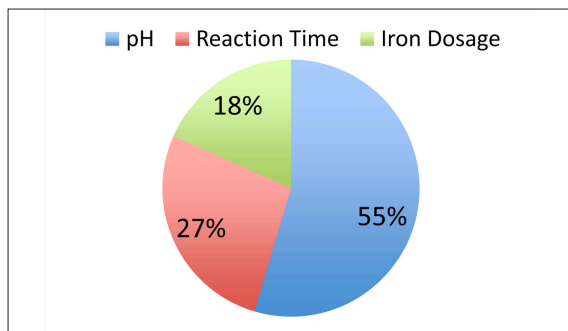
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Subject Area	Energie- und Umwelttechnik
Project Partner	East China University of Science and Technology, Shanghai

Treatment of Dyeing Wastewater by Reduction with Iron

Bachelor Thesis for Environmental Engineering



Original dyeing wastewater to be treated, compared with clear pipe water



Comparison of the influence of the 3 different parameters on the color removal

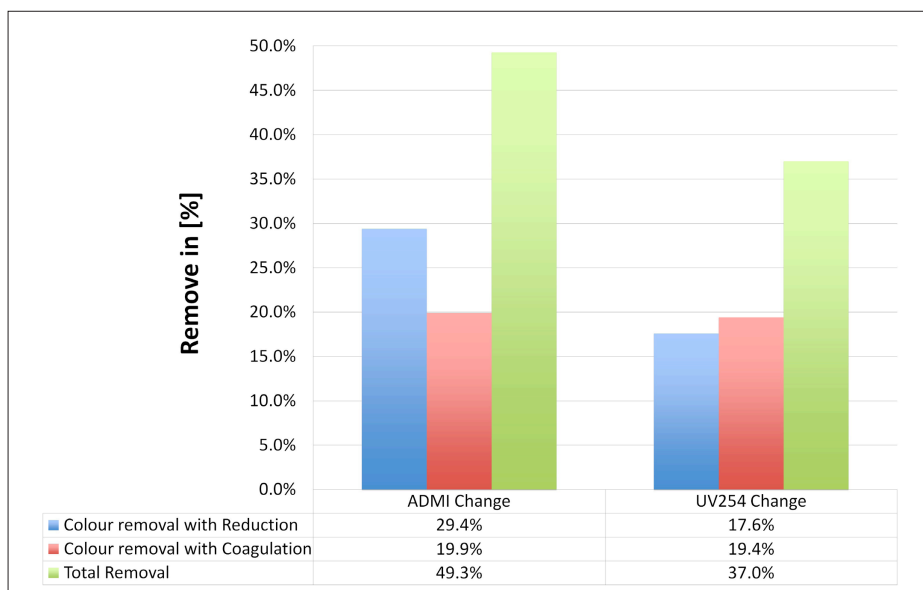
Introduction: The demand for the cleaning of industrial wastewater in Asian countries is increasing. While the objective of wastewater treatment is usually the removal/destruction of hazardous substances, it is sometimes important to just decolorize wastewater. For example, the textile industry requires a large amount of fresh water for rinsing clothes that have been dyed in various colors. While it does not necessarily pose an environmental hazard, the discharge of large amounts of colorized wastewater into rivers is clearly unacceptable. If it was possible to remove the color from the wastewater, it could be recycled into the dyeing process, saving costs.

Procedure/Result: The main objective of this thesis was to assess the amount of colour that can be removed from the wastewater by using an iron-based treatment. The aim was to determine, by way of experiments, how high the iron concentration needed to be, the optimum pH range, and the reaction time required. Two cases were to be considered: firstly, the conditions necessary for maximum effect and secondly, a trade-off between ecological impact and cost. The tests showed that two effects are responsible for the removal of dye. The chemical reaction with iron and the coagulation when the wastewater becomes adjusted to pH 8.

- Best point: pH 2, iron dosage 1 g, reaction time 150 minutes
- Reasonable point: pH 5, iron dosage 1 g, reaction time 150 minutes

The most important factor for the cost is the pH. To remove a lot of color it would need a very low pH which, in practice, is not economically feasible.

Solution: The problem with dye in wastewater cannot easily be solved just by end-of-pipe treatment – one has to take into account an integrated view of pollution control. The industry will have to use better processes, which produce less waste dyes. That is not only good for the environment but is also economically advantageous.



Color (ADMI) and organics (UV254) removal for the reasonable point, with the parameters: pH 5, 150 min reaction time and 1 g iron dosage