Experimental Setup of Corona Discharge on Dye Degradation for Science Education

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Abstract : The presence of organic dyes in water is a critical issue that poses a significant threat to the environment and human health. We have investigated the use of corona discharge as a potential method for degrading organic dyes in water. Methylene Blue dye was exposed to corona discharge, and its photo-absorbance was measured over time to determine the extent of degradation. The results depicted a decreased absorbance for the dye and the loss of the characteristic colour of methylene blue. The effects of various parameters, including current, voltage, gas phase, salinity, and electrode spacing, on the reaction rates, were investigated. The highest reaction rates were observed at the highest current and voltage (up to 10kV), lowest salinity, smallest electrode spacing, and an environment containing enhanced levels of oxygen. These findings have possible applications for science education curriculum. By investigating the use of corona discharge for destroying organic dyes, we can provide students with a practical application of scientific principles that they can apply to real-world problems. This research can demonstrate the importance of understanding the chemical and physical properties of organic dyes and the effects of corona discharge on their degradation and provide a holistic understanding of the applications of scientific research. Moreover, our study also emphasizes the importance of considering the various parameters that can affect reaction rates. By investigating the effects of current, voltage, matter phase, salinity, and electrode spacing, we can provide students with an opportunity to learn about the importance of experimental design and how to evade constraints that can limit meaningful results. In conclusion, this study has the potential to provide valuable insights into the use of corona discharge for destroying organic dyes in water and has significant implications for science education. By highlighting the practical applications of scientific principles, experimental design, and the importance of considering various parameters, this research can help students develop critical thinking skills and prepare them for future careers in science and engineering.

Keywords : dye degradation, corona discharge, science education, hands-on learning, chemical education
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