

Industrial Chemistry 2020: Environmental sustainability through an eco-friendly dyeing system - Adewale Adedokun – The Federal Polytechnic

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Abstract

The various processes used in the textile processing industry contribute its major portion to the environmental pollution. The discharge of highly coloured waste is not only aesthetically displeasing, but it also interferes with the transmission of light and upsets the biological processes which may then cause the direct destruction of aquatic life present in the receiving stream. A small amount of dye in water (10-50mg/L) is highly visible and reduces light penetration in water systems, thus causing a negative effect on photosynthesis. Escalating costs of effluent treatments due to increasingly stringent governmental regulations pose a major economic problem for the textile industry. The most effective means to curb these costs is waste minimization at the source by optimizing application processes. This itself is achieved by using some carefully chosen heterocyclic disperse dyes which were synthesized in our laboratory. Some novel 2-aminothiophenes were prepared from cyanoacetates and a range of 1,3- dicarbonyl compounds such as, o-acetoacetotoluidide, 4-chloroacetoacetanilide, and o-acetoacetanilide using the Karl-Gewald one-pot technique. The 2-aminothiophenes are the major precursors for a number of dyestuff syntheses. The strategically located cyano, methylester, ethylester groups in the 3-position of the thiophene moiety was intended to confer a range of desirable properties on disperse dyes produced from the amines. Subsequently the application protocol enables alkali after-treatment of the disperse dyed polyester materials rather than reduction clearing. The numerous advantages of this novel method in savings from water usage, chemicals and materials and consequent benefits on environmental sustainability are highlighted in this paper.

Biography

Dr. Adedokun has his PhD at the Ahmadu Bello University, Zaria, Nigeria. He was also a research scholar at the Wilson College of Textiles, at the North Carolina State University, Raleigh, North Carolina, USA. He is currently a lecturer/researcher at the Federal Polytechnic, Kaura-Namoda, Nigeria. He has published a number of journals and attended relevant conferences worldwide. His current research work is on 'A new and sustainable approach at combating environmental pollution from textile/leather effluents in Nigeria's growing Industries'