IAEA-CN-332/648

Treatment of Effluent from Industrial, Automotive, and Refinish Paints by Electron Beam Irradiation

F. Codelo (FIB - Faculdades Integradas de Bauru), C. Lopes Duarte (IPEN - Instituto de Pesquisa Energética e Nuclear), W. Calvo (IPEN - Instituto de Pesquisa Energética e Nuclear) – Brazil

Paint is a polymeric layer to protect, signal and beautify a substrate. Made up of resins, pigments, fillers, solvents and additives. The effluent generated in the production of paints must be treated to avoid causing contamination of rivers, minimizing environmental impacts. Chemical oxidation processes are promising for the degradation of toxic organic compounds. The most efficient methodology is oxidation through attack by the hydroxyl radical (OH), in the advanced oxidation process - AOP, in electron beam accelerators adopted by several countries in which complex organic compounds are removed. The objective of this study was to apply AOP by ionizing radiation in the treatment of effluent from the manufacture of automotive, industrial and automotive refinish paints. In this case study, electron beam processing applied to paint industry effluents was developed. The research was carried out in three phases: doses of 10, 30, 50, 80 and 100 kGy were applied; doped with 0.005%, 0.05% and 0.5% hydrogen peroxide by volume. The main results demonstrated an average reduction of around 10% in Chemical Oxygen Demand, COD and around 25% in Biochemical Oxygen Demand, BOD, in addition to the whitening of the effluent.