

Catalytic properties of Polyoxometalates and its application in Dyes Removal from a Textile Effluent

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Abstract : The Wells-Dawson-derived sandwich-type polyoxometalates (POMs) and many of their transition- metal complexes are especially promising in catalysis are a versatile and robust group of compounds with applications in catalysis. The physicochemical and catalytic behaviors of multi-iron Wells-Dawson sandwich-type polyoxometalates were studied, when NMRP and Infrared spectra of heteropolyanions (POMs) were used to explain the structure catalysts formed. Catalytic properties of the sandwich-type heteropolytungstate $[P_2W_{18}O_{62}]^{6-}$ in the selective oxidation of organic substrates with aqueous H_2O_2 have been studied. This work shows results on the catalytic oxidation process for a dye used in textile industry. Catalytic activity of the polyoxometalates oxidation for dye solution was determined by measuring the chemical oxygen demand and colour removal. The influence of the main operating parameters, hydrogen peroxide concentration, pH, temperature and dye concentration have been studied, in a batch-type operation. The results obtained show that the best pH value for decolorisation was pH 3, with an average decolorisation of 94% and average removal of chemical oxygen demand of 91% at 20°C.

Keywords : Wastewaters treatment; dyes; polyoxometalates; counter ions; catalysts