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ABSTRACT

The influence of 18-crown-6 on the oxidation of toluene and benzene was investigated using varying oxidants namely, KMnO_4 , $\text{K}_2\text{Cr}_2\text{O}_7$, and K_2CrO_4 . The six reaction solutions that were investigated are toluene (or benzene)- KMnO_4 -crown ether, toluene (or benzene)- $\text{K}_2\text{Cr}_2\text{O}_7$ -crown ether, and toluene (or benzene)- K_2CrO_4 -crown ether.

Ultraviolet-visible (UV-Vis) scannings of the reaction mixtures over a one hour period revealed decreasing absorbance readings coupled with decolorization indicating the occurrence of a reaction.

Fourier transform infrared (FT-IR) spectral analyses of the evaporation products from the reaction mixtures revealed key functional groups as follows: broad absorption bands at 3440 cm^{-1} to 3414 cm^{-1} which characterize O-H stretching vibrations; medium to strong bands at 1663 cm^{-1} to 1650 cm^{-1} , characteristic of C=O stretches as effected by conjugation or unsaturation on each side of the carbonyl group; and sharp band at 1729 cm^{-1} , another characteristic infrared absorption for the C=O stretch. These findings suggested the ring opening and oxidation of the arenes in the presence of 18-crown-6 to carboxylic acids.

