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INVESTIGATION OF THE INFLUENCE OF 18-CROWN-6
ON THE OXIDATION OF SELECTED ARENES

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by

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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$_4$, K$_2$Cr$_2$O$_7$, and K$_2$CrO$_4$. The six reaction solutions that were investigated are toluene (or benzene)-KMnO$_4$-crown ether, toluene (or benzene)-K$_2$Cr$_2$O$_7$-crown ether, and toluene (or benzène)-K$_2$CrO$_4$-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.