

PHOTOCATALYTIC OXIDATION OF CYCLOHEXANE BY ATMOSPHERIC OXYGEN
IN CH₂Cl₂ IN THE PRESENCE OF AN OXOMETALLATE-
TETRAALKYLAMMONIUM SYSTEM

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The photocatalytic activation of alkanes [1] in the presence of transition metal complexes is a promising new area of research [2-4]. We have found that irradiation of a solution of $1.15 \cdot 10^{-3}$ mole cyclohexane in 5 ml CH₂Cl₂ in a glass vessel surrounded by a water-cooling jacket (10°C) with the full light of a 125-W luminescent lamp upon stirring in the air in the presence of $2.5 \cdot 10^{-6}$ mole oxometallate and $2.5 \cdot 10^{-6}$ mole C₆H₅CH₂N(C₂H₅)₃Cl (I) leads to the oxidation of cyclohexane. The experiments were carried out over 3 h. In the case of NaVO₃ (IV), $41.2 \cdot 10^{-6}$ mole cyclohexanol (II) and $31.6 \cdot 10^{-6}$ mole cyclohexanone (III) were obtained. In the case of Na₅V₁₀O₂₈, $3.5 \cdot 10^{-6}$ mole (II) and $2.2 \cdot 10^{-6}$ mole (III) were obtained. In the case of Na₅H₇Mo₈V₅O₃₉, $6.6 \cdot 10^{-6}$ mole (II) and $3.9 \cdot 10^{-6}$ mole (III) were obtained. In the case of H₃PMO₁₂O₄₀, $3.4 \cdot 10^{-6}$ mole (II) and $1.8 \cdot 10^{-6}$ mole (III) were obtained. In the case of H₄SiMo₁₂O₄₀, $2.8 \cdot 10^{-6}$ mole (II) and $1.0 \cdot 10^{-6}$ mole (III) were obtained. In the case of H₃PW₁₂O₄₀, $22.8 \cdot 10^{-6}$ mole (II) and $16.7 \cdot 10^{-6}$ mole (III) were obtained. In the presence of only (I), the yields of (II) and (III) under the same conditions are $2.0 \cdot 10^{-6}$ and $1.3 \cdot 10^{-6}$ mole, respectively. The oxidation also proceeds in the presence of (IV)-(n-C₄H₉)₄NBr. The oxidation virtually does not proceed in the presence of (I) and (IV) in acetonitrile.

LITERATURE CITED

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