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Mechanism of Electrochemical Synthesis of Phosphonium and Quasiphosphonium Salts

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Abstract

The radical cations generated on the anode in the course of electrochemical oxidation of tripropylphosphine in the presence of toluene and water are established to react with the aromatic compound and initial phosphine rather than with water molecules. The experimental findings made it possible to propose a new method of electrochemical synthesis of arylphosphonium salts. The electrochemical synthesis of quasiphosphonium salts, performed by electrochemical oxidation of tertiary phosphines in the presence of alcohols, amines, phenols, thiols, and disulfides, is assumed to involve a diphosphonium intermediate, while the synthesis of arylphosphonium cations proceeds by the mechanism of free-radical aromatic substitution.
