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MICROWAVE-ASSISTED SYNTHESIS OF 1-ETHYL-3-METHYLIMIDAZOLIUM BROMIDE

A protocol is described for the laboratory bench scale (130 mmol) microwave-assisted synthesis of 1-ethyl-3-methylimidazolium bromide in 66 % yield, with no detectable impurities by ^{1}NMR.

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ELECTRICAL CONDUCTIVITY PROFILES OF BLENDS OF POLYANILINE AND POLY-ARYLENE VINYLENES

Poly(1,4-phenylene vinylene) (PPV) and poly(2,5-dimethoxy 1,4-phenylene vinylene) (dMeOPPV) were separately blended with polyaniline (PANI) over a range of compositions. PANI was doped with camphor sulfonic acid (CSA), PPV with $FeCl_3$, and dMeOPPV with iodine vapor. The 2-probe electrical conductivity profiles over a range of compositions of the blends were examined. There was no indication that the electrical conductivities of the materials in the blend were coupled. A percolation threshold could be observed in both blend systems, which when surmounted, showed conductivities that were dependent on the concentration of the main charge carrier, the higher conducting material.

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1,1-DIPHENYL-2-TRIMETHYLSILYL OXIRANE –ITS DIRECT CONVERSION TO THE ALLYL-SILANE 1,1-DIPHENYL-3-TRIMETHYLSILYL PROPENE

The conversion of benzophenone to the epoxide 1,1-diphenyl-2-trimethyl oxirane, and its subsequent reaction with trimethylsilylmethyl magnesium chloride, $TMSCH_2MgCl$, to afford the allylsilane 1,1-diphenyl-3-trimethylsilyl propene in excellent yield is described.

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OXIDATION OF ANTHRACENE AND PHENANTHRENE BY A HIGH VALENT RUTHENIUM CATALYST IN A SOL-GEL MATRIX

A sol-gel derived hybrid material containing a ruthenium-based complex in a porous silica network was prepared and tested for its ability to promote the oxidation of anthracene and phenanthrene substrates. A bifunctional silylether phosphene was used as a ligand for the preparation of the precursor, $RuCl_2L_3$ ($L = Ph_2P(CH_2)_2Si(OEt)_3$). The silylether complex was covalently anchored in a silica matrix by co-condensation with $Si(OEt)_4$. Chloride ligands were removed using Ag(I) and the resulting ruthenium aqua moiety was oxidized to its active catalyst form using Ce(IV). The immobilized ruthenium species catalyzes the oxidation of anthracene to 9, 10-anthraquinone. Phenanthrene oxidation produced no 9,10-phenanthrenedione. The primary product of phenanthrene oxidation was (1,1'-biphenyl)-2,2'-dicarboxaldehyde. No oxidation of the ruthenium-based ligands was observed.

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THE ROLE OF THE METAL ATOM IN METALLOPORPHYRINS

Electronic structure calculations were performed for a series of metalloporphyrin complexes that contain nickel, copper, and zinc. One of the reasons for studying these systems is the predominance of nickel complexes in the geological setting to the virtual exclusion of the other two. These calculations revealed an interesting feature of the nickel complex that distinguishes it, suggesting an explanation for the predominance of such complexes in the geosphere.

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FORMATION OF CARBOHYDRATES IN THE PHOTOLYSIS OF FORMALDEHYDE

The photolysis of formaldehyde under UV light at 77 K produces a mixture of carbohydrates. A proposed mechanism involves the formation of hydroxymethylene [**1**] by the rearrangement of formaldehyde under UV light. Subsequent nucleophilic addition of hydroxymethylene to formaldehyde produces glycolaldehyde which reacts further with hydroxymethylene to form higher carbohydrates. This type of reaction might have played a role in the prebiotic formation of carbohydrates.

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DETERMINATION OF COBALT(II) BY FLOW INJECTION ANALYSIS USING A SURFACTANT SOLVENT SYSTEM

A Flow Injection Analysis method for cobalt determination from the formation of the blue cobalt thiocyanate complex, l = 625 nm in 3.0% of the surfactant Tween-80 has been developed that eliminates the required use of acetone, isoamyl alcohol, or other organic solvents. A detection limit of 1.20 ppm Cobalt(II) was reached and the method conformed to Beer's Law for concentrations as high as 750.0 ppm with a 5.0 µL sample loop, and a flow rate of 2.00 mL per minute. An extensive ion interference and masking agent study was conducted and found that a 0.0010 M EDTA solution at pH 2.50 masked most of the interfering ions.

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