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Design of Electrode Providing Preparative Stereoselective Synthesis

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For the selective electro-preparative syntheses of organic compounds, the electrode system composed of a graphite felt (GF) electrode coated with mediator-modified poly(acrylic acid) (PAA) was designed and prepared. In this study, characteristics of three GF electrodes differing from raw materials and the surface characteristics of these GF electrodes immobilizing redox mediator of 2,2,6,6-tetramethylpiperidinyl-1-oxyl (TEMPO) were discussed. Among TEMPO-modified PAA-coated GF electrodes tested, the GF electrodes originated from pitch fibers was the best results for the enantio- and stereo-selective oxidations of geraniol and 2-naphthol, respectively, than the GF electrodes originated from polyacrylonitrile and phenolic resin fibers. The oxidation of racemic *sec*-alcohols and diols by chiral TEMPO of (6*S*, 7*R*, 10*R*)-4-amino-2,2,7-trimethyl-10-isopropyl-1-azaspiro[5,5]undecane-*N*-oxyl were carried out in high enantio- and stereo-selective yield and high isolated yield, respectively. The system can provide an ecologically clean process and will contribute to the development of green chemistry.

Key Words : TEMPO, poly(acrylic acid), graphite felt, mediator-modified electrode, macro-electrolysis