

Solvent and Temperature Effects on the Platinum-Catalyzed Oxidative Coupling of 1-Naphthols

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Abstract

Using H₂O₂ as the oxidant, 1-naphthols with electron-donating groups at the 2- and 4-positions couple oxidatively over a carbon-supported platinum catalyst to 3,3'-substituted 1,1'-binaphthalenyldiene-4,4'-diones and 4,4'-substituted 2,2'-binaphthalenyldiene-1,1'-diones, respectively. The binaphthalenyl diols are the intermediates. The selectivity to individual products is influenced by the reaction temperature (room temp. or reflux) and by the solvent used. Under reflux, complete conversions are obtained within 40 min. At room temp. high diol yields can be obtained, e.g. 96 % from 2-methyl-1-naphthol in MeOH. Under reflux the reaction proceeds always further to the diones (at least to some extent), and THF is a promising solvent for the selective one-pot two-step oxidation of 1-naphthols to the diones (e.g. 81 % from 4-methoxy-1-naphthol). In most other solvents (reflux) naphthoquinones are observed as byproducts. In an attempt to optimize the yield of menadione, 30.5 % was obtained in boiling MeNO₂.