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Substituent Effects of Potassium Phenoxides on the Carboxylation of Indene by Carbon Dioxide*

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The carboxylation of indene by carbon dioxide was investigated in the presence of substituted phenoxide in DMF. The reaction took place rapidly at 0°C and was apparently completed within about ten minutes. Indene-3-carboxylic acid was found to be formed in 42—98% yields from indene, depending on the substituents (*p*-OC_4H_9, *p*-OCH_3, *p*-CH_3, H, *p*-Cl, *m*-Cl, *p*-CN, and *m*-NO_2) of the phenoxides. The substituent effect upon the interaction of carbon dioxide with substituted phenoxides was observed. And it was found that the yield of indene-3-carboxylic acid increased with the substituents of negative σ values, giving rise to a linear relation between the logarithm of the equilibrium constants of carboxylation of indene and the σ values. Relative rates of reaction were compared with the various substituted phenoxides mentioned above. The mechanism of reaction is briefly discussed.

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