

SYNTHESIS OF 2-PYRIDONES BY THE CO-TRIMERIZATION
OF ACETYLENES AND ISOCYANATES

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As part of our studies on the synthesis of 6-membered heterocyclic compounds by the co-trimerization of acetylenes and hetero-unsaturated compounds in the presence of transition metal complexes, the synthesis of 2-pyridones from acetylenes and isocyanates has been investigated.

The reaction of isocyanates with cobaltacyclopentadiene complexes (1) composed of two molecules of acetylenes and a cobalt atom was found to provide a facile synthetic route to 2-pyridones. For example, η^5 -cyclopentadienyltriphenylphosphine-2,5-diphenyl-3,4-bis(methoxycarbonyl)cobaltacyclopentadiene (1a) reacted with phenyl isocyanate at 130° to give dimethyl 1,3,6-triphenyl-2-pyridone-4,5-dicarboxylate in a 66 % yield.

The pyridones were catalytically obtained from acetylenes and isocyanates in the presence of 1 or cobaltocene, $(\eta^5\text{-C}_5\text{H}_5)_2\text{Co}$. Following acetylenes and isocyanates were employed; methyl phenylpropiolate, diphenylacetylene, 1-phenylpropyne, phenylacetylene, acetylene, propyne, 1-hexyne, phenyl isocyanate, methyl isocyanate and n-butyl isocyanate. For example, the reaction of methyl phenylpropiolate with phenyl isocyanate in the presence of catalytic amounts of 1a at 135° for 19 hr gave dimethyl 1,3,6-triphenyl-2-pyridone-4,5-dicarboxylate and dimethyl 1,4,6-triphenyl-2-pyridone-3,5-dicarboxylate in 40 and 26 % yields, respectively.