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The Hydrolysis of Phosphate Esters Can Be Enhanced by Intramolecular Hydrogen Bonding

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Abstract : The research project aim is to study the hydrolysis of 8-diethylphosphate-1-naphthalenol with hydroxylamine in water. 8-diethylphosphate-1-naphthalenol, 1 was successfully synthesized and its rate of reaction with hydroxylamine was studied at 60°C. Pseudo first order behavior was observed. The rate of P-O cleavage of 1 at 60°C (7.43 x 10-3 M-1s-1) was found to be 178 fold and 7 fold slower than diethyl 8-dimethylamino-1-naphthyl phosphate, 3 at 60°C (1.32 M-1s-1) and diethyl 8-amino-1-naphthyl phosphate, 2 at 90 °C (5.5 x 10-2 M-1s-1) respectively. The rate of P-O cleavage of 1 with hydroxylamine was found to be faster than that of 4-chlorophenyl-1-cyclopropylphosphate triester, 5 where the reaction was too slow to observe at 60°C.

Keywords : phosphate esters, intramolecular hydrogen bonding
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