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## Phosphorus, Sulfur, and Silicon and the Related Elements

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### One Pot Synthesis of Bisphosphonate Esters: A Way to Synthesize Tetraphosphonate Esters

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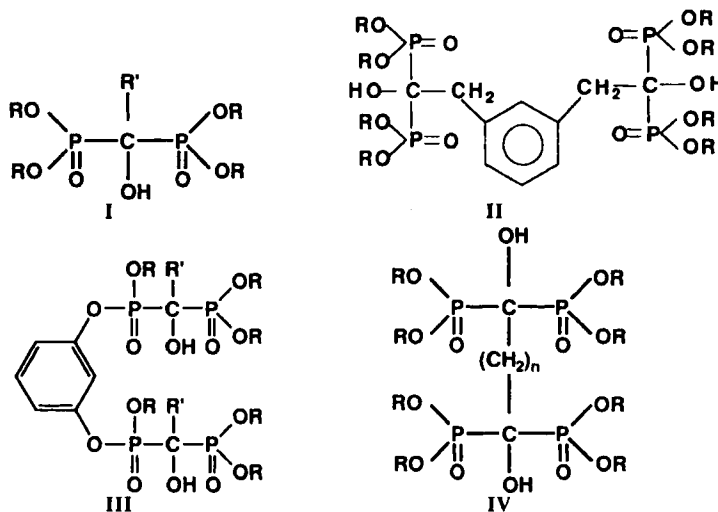
## One Pot Synthesis of Bisphosphonate Esters : a Way to Synthesize Tetraphosphonate Esters

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Several methods for the preparation of symmetrical bisphosphonates of general type  $(RO)_2P(O)(R'OH)P(O)(OR)_2$ , have been developed, and investigated for their pharmacological. Pharmacological screening of these bisphosphonates have shown that these compounds have potent cardiovascular activity and are potentially useful in the treatment of hypertension. In this work we described of new method "one pot" for the synthesis of hydroxy bis and tetra phosphonates (I, II, III and IV).

The reaction of acyl chlorides with trialkyl or bistralkylphosphites or acyl chlorides with two molecules of trialkylphosphite in presence of protic reagent ( $H_2O$ ,  $RCOOH$ ....) has given the corresponding tetrphosphonate esters.



$R' = CH_3$ -,  $CH_3-(CH_2)_n$ -,  $C_6H_4(CO)_2N-(CH_2)_n$ -,  $C_6H_5$ -,  $C_6H_5-CH_2$ -  
 $R = CH_3$ -,  $C_6H_5-CH_2$ -,  $pCH_3O-C_6H_4$ -,  $pO_2N-C_6H_4-CH_2$ -

These compounds were hydrolysis to give the phosphonic acids. A reaction between compound II and  $M^+$  has given HEDP salts and benzoic acid.