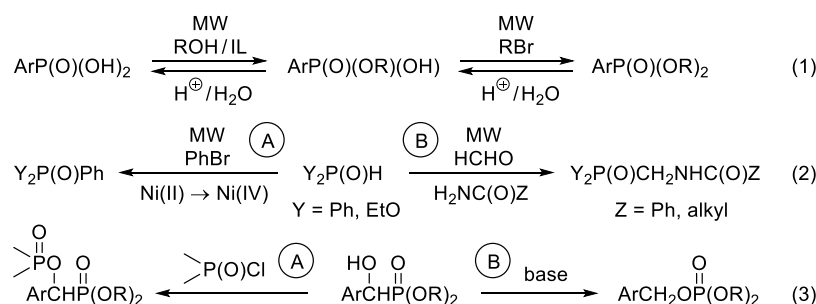


## Newer developments in the green synthesis of tertiary phosphine oxides, phosphinates, phosphonates and their derivatives

György Keglevich, Nikoletta Harsági, Petra R. Varga, Bianka Huszár,  
Réka Henyecz, Nóra Zs. Kiss, Zoltán Mucsi, Péter Bagi

Department of Organic Chemistry and Technology, Budapest University of Technology and Economics,  
1111 Budapest, Műegyetem rkp. 3, HUNGARY  
e-mail: keglevich.gyorgy@vbk.bme.hu

The MW-assisted direct esterification of phosphinic and phosphonic acids may be promoted by ionic liquid catalysts. For the introduction of the second alkyl group, O-alkylation is the method of choice (1).[1,2] A few esterifications and transesterifications were performed in a flow MW reactor.[3] Hydrolysis of P-esters including the two-step conversion of phosphonates was studied (1).[4,5] After elaborating the MW-assisted Pd(OAc)<sub>2</sub>-catalyzed “P-ligand-free” P–C coupling of >P(O)H reagents and bromoarenes,[6] the Ni-catalyzed version involving a surprising mechanism via a Ni(II)→Ni(IV) transition was also investigated (2/A).[7–9] The Kabachnik–Fields condensation of carboxylic amides, aldehydes and >P(O)H reagents was utilized in the synthesis of new α-aminophosphonates (2/B).[10] α-Hydroxyphosphonates prepared in Pudovik reaction were useful starting materials in phosphorylations (3/A) [11] and rearrangement reactions (3/B).[12] Novel phosphonoylmethyl-α-hydroxyphosphonates were made available by the addition of dialkyl phosphites to an 2-oxopropylphosphonate.[13] The optical resolution of α-hydroxyphosphonates was also elaborated.[14] It is the purpose of this paper to show the application of green chemical tools, such as MWs, ILs, as well as flow-chemistry within OPC.



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