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An Efficient Route to Iodohydrin Using Polymer-supported Hypervalent Iodine(III) Reagent

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Abstract: Several iodohydrins are synthesized in fairly high yields by using polystyrene-supported phenyliodine(III)bis(trifluoroacetate).

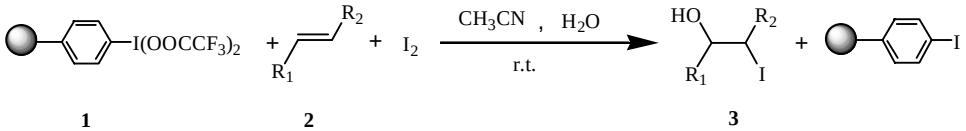
Keywords: Polystyrene-supported phenyliodine(III)bis(trifluoroacetate), olefin, iodohydrins, iodohydroxylation.

Polymer-supported hypervalent iodine compounds are increasingly used in organic synthesis and in the pharmaceutical industries as environmentally friendly reagents with their versatile reactivity[1]. Especially, polystyrene-supported phenyliodine (III) bis-(trifluoroacetate) was widely used as a mild and clean oxidant.

Iodohydrins are important organic intermediates, which could not be obtained by the direct treatment of alkenes with iodine in water[2]. Contributions to solve this problem appeared in the recent literature[3-6]. Among them, the method using phenyliodine(III)bis-(trifluoroacetate) (BTI)/I_2 system in CH_3CN-H_2O has the advantages of mild reaction conditions and simple procedure[6]. But the by-product, *i.e.* iodobenzene is difficult to separate from the product. Herein, we report an improved synthesis of iodohydrins using polystyrene-supported phenyliodine(III)bis(trifluoroacetate). The resin could be regenerated and reused[7].

The synthesis of iodohydrins was simply carried out by stirring a mixture of polystyrene-supported phenyliodine(III)bis(trifluoroacetate) (1.2 mmol) with iodine (0.6 mmol), and olefins (1.0 mmol) in CH_3CN-H_2O (4: 1, V/V) at room temperature overnight (**Scheme 1**). Iodohydrins were obtained in fairly high yields and the results are summarized in **Table 1.**

Scheme 1



1 **2** **3**

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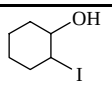
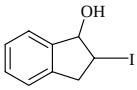
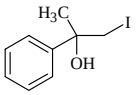
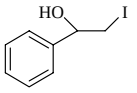
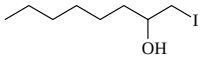
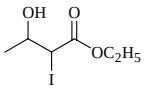
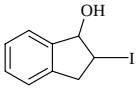
Table 1 Synthesis of iodohydrins using polystyrene-supported phenyliodine(III)bis(trifluoroacetate)

Entry	Olefins	Products	Yield (%) [a]
1	Cyclohexene	 **3a**	80
2	Indene	 **3b**	85
3	α -Methyl styrene	 **3c**	76
4	Styrene	 **3d**	93
5	1-Octene	 **3e**	66
6	Ethyl, *trans*-crotonate	 **3f**	62
7	Indene	 **3b**	84[b]

a The yields are based on the olefins; b Using regenerated resin.

In conclusion, polystyrene-supported phenyliodine(III)bis(trifluoroacetate) shows good reactivity in the iodohydroxylation of olefins. After the reaction, the poly-(iodostyrene) can be recovered by simple filtration and the polystyrene-supported phenyliodine(III)bis(trifluoroacetate) can be regenerated and reused.

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