Notwithstanding the unique advantages of ionic liquids (IL’s) as reaction media and catalysts including biological systems, currently they have not been widely applied in industry. The reason for this is probably related to the high cost of economic acid-base neutralizations. For example the probability, ionic liquids, the difficulty in separation or recycling, the paucity of data with regard to their toxicity and biodegradability, etc. [1-5]. To overcome these disadvantages, recently some new ionic liquids have been prepared via simple and economic acid-base neutralizations. For example the preparation and application of the Brönsted acid-base ionic liquids from imidazole and bis(trifluoromethanesulfonyl)amide [6], a new class of ionic liquids by neutralization of 1,1,3,3-tetramethylguanidine with different acids have been reported [7]. Similarly, the synthesis of ionic liquids using quaternary ammonium hydroxide and chiral carboxylic acids have also been reported [8]. Although there are several reports on ionic liquids, the preparation of chiral ionic liquids using inexpensive starting materials is very limited.  

Among carbonic acid derivatives used as protecting groups, tert-butylocarbamates and tert-butylylcarbamates are of great importance in organic chemistry [9], because they are stable to wide range of nucleophiles in alkaline conditions and are very liable under moderately acidic conditions to give the parent alcohols and amines. Classically, introduction of tert-Boc group to an amine is generally achieved by reaction of amine with di-tert-butyl dicarbonate in the presence of dimethylaminopyridine [15]. tert-Boc transfer reactions using tert-Boc-imidazole [16] or tert-butoxycarbonyl-1,2-dihydroisoquinoline [17]. Although, various base mediated methods are available for the preparation of N-tert-butylocarbamates using di-tert-butyl dicarbonate and also few reports on acid-mediated reaction Ytrria-Zirconia [18], Cu(BF$_4$)$_2$ [19], InBr$_3$ [20], HClO$_4$·SiO$_2$ [21], La(NO$_3$)$_3$·6H$_2$O [22], H$_3$PW$_12$O$_{40}$[23], LiClO$_4$[24] and I$_2$[25] as Lewis acids catalysts and also in water [26], sulfonic-acid-functionalized silica [27] as a catalyst for N-tert-butoxycarbonylation of amines. The catalyst free ionic liquid mediated N-tert-butoxycarbonylation of amines is not investigated so far. The selected ionic liquid, tetrapropylammonium L-prolinate [TPA][Pro] was reported as an efficient reaction medium for the synthesis of β-keto-sulfones, β-hydroxsulfones, N-benzoxycarbonylation of amines [28,29]. We reported number of studies on molecular interactions between various ionic liquid’s [30-33] and organic solvents, but in the present investigation an attempt was made to utilize ionic liquid [TPA][Pro] as an efficient reaction medium for N-tert-butoxycarbonylation of amines with di-tert-butyl dicarbonate.

**EXPERIMENTAL**

All the chemicals used were of AR grade, purchased from Merck manufactures Pvt. Ltd. and were used as such. The melting points were calculated on Remi melting point apparatus. All the reactions were monitored by TLC and the yields refer to isolated products. The IR spectra were recorded on Shimadzu spectrophotometer using KBr pellet method, proton NMR spectra were recorded in CDCl$_3$ on Bruker instrument at 300 MHz and $^{13}$C NMR spectra were recorded in CDCl$_3$ on a Bruker
spectrometer at 100 MHz. Mass spectra were recorded on Elegant LC-1100 series instrument.

**General procedure for preparation of N-tert-butyl-carbamates:** To the ionic liquid [TPA][Pro] (1 mL) was added amine (1-14; Table-1) (1 mmol) and di-tert-butyl dicarbonate (1.2 mmol). The reaction was stirred at room temperature for an appropriate time (Table-1). After completion of the reaction as monitored by TLC, water was added to the reaction mixture and the product was extracted into ethyl acetate (3 × 20 mL). The combined organic layer was washed with brine solution and concentrated under reduced pressure to give crude product, which was purified over silica gel column to afford corresponding N-tert-butylcarbamate. The ionic liquid [TPA][Pro] in aqueous solution was recovered by removing water under reduced pressure and dried. The recovered ionic liquid was reused for five times without loss of its activity. Finally, all the compounds confirmed by their m.p.’s, IR, $^1$H NMR, $^{13}$C NMR, mass spectral data and elemental analysis wherever needed.

<table>
<thead>
<tr>
<th>Entry</th>
<th>Substrate</th>
<th>Product</th>
<th>Time (min)</th>
<th>Yield (%)$^a$</th>
</tr>
</thead>
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<tr>
<td>1</td>
<td>R$^1$ = H, R$^2$ = H, R$^3$ = H</td>
<td>R$' = H$, R$'' = H$, R$''' = H$</td>
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<td>100</td>
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<tr>
<td>2</td>
<td>R$^1$ = CH$_3$, R$^2$ = H, R$^3$ = H</td>
<td>R$' = CH_3$, R$'' = H$, R$''' = H$</td>
<td>25</td>
<td>95</td>
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<tr>
<td>3</td>
<td>R$^1$ = OH, R$^2$ = H, R$^3$ = H</td>
<td>R$' = OH$, R$'' = H$, R$''' = H$</td>
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<td>99</td>
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<tr>
<td>4</td>
<td>R$^1$ = H, R$^2$ = NO$_2$, R$^3$ = H</td>
<td>R$' = H$, R$'' = NO_2$, R$''' = H$</td>
<td>15</td>
<td>95</td>
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<tr>
<td>5</td>
<td>R$^1$ = H, R$^2$ = H, R$^3$ = NO$_2$</td>
<td>R$' = H$, R$'' = H$, R$''' = NO_2$</td>
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<tr>
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</table>

$^a$Isolated yields after silica gel chromatography.
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REFERENCES


