Aluminum Trifluoromethanesulfonate

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(F) Gohain et al.\textsuperscript{17} reported a ‘green’ Friedel–Crafts, Michael-type addition of indole to α,β-unsaturated ketones catalyzed by Al(OTf)$(_3$) in the recyclable solvent polyethylene glycol.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure.png}
\caption{Reaction Scheme}
\end{figure}

(G) Parvanak-Boroujeni and co-workers utilized polystyrene-supported aluminum triflate in the acylation of a range of aromatic substrates with benzoic acid and were able to obtain the corresponding benzophenones in excellent yields.\textsuperscript{18}

(H) Williams and co-workers discovered that aluminum triflate could be used as a highly active non-protic co-catalyst for the palladium-catalysed methoxycarbonylation of alkenes.\textsuperscript{4} High conversions (up to 98%) were obtained for the methoxycarbonylation of styrene with \( \frac{b}{l} \) ratios of up to 3:1. One of the main advantages of the Lewis acid co-catalyst is that it does not lead to phosphonium salt formation and depletion of the ligand, resulting in palladium ‘fall-out’ during these reactions.

(I) During the author’s M.Sc project, the utilization of Al(OTf)$(_3$) as co-catalyst in alkoxycarbonylation was extended to include alkyl-substituted styrene substrates. In this regard, PdCl$_2$ was found to be more reactive than Pd(OAc)$_2$, and trans-β-methylstyrene could be transformed into its respective methyl and ethyl esters with up to 95% conversion, with the major products being linear in this instance.\textsuperscript{19}

(J) The Williams group\textsuperscript{11} found that the alkoxycarbonylation reaction could be extended to include alkynes when a bidentate ligand is utilized in the process. High conversions (100%) with very high \( \frac{b}{l} \) ratios (99:1) were obtained.

References