ALCOHOL OXIDATION PROMOTED BY NOVEL RECYCLABLE C_{60}-TEMPO ORGANOCATALYSTS

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Oxidation of alcohols to carbonyl compounds plays an important role in both the industrial synthesis and laboratory research.[1] In this process, use of metal free nitroxy radical TEMPO (2,2,6,6-tetramethyl piperidine-1-oxyl) as a catalyst has gained much attention in the selective oxidation of primary and secondary alcohols to carbonyl compounds.[2] However, the relatively high prices of such derivatives prevent their large scale employment, making recovery of the catalyst highly desirable. Herein, we show for the first time the use of [60]fullerene as a molecular platform for supporting several organocatalytic TEMPO moieties to be used in the quantitative oxidation of alcohols to their corresponding carbonyl compounds (Scheme 1).

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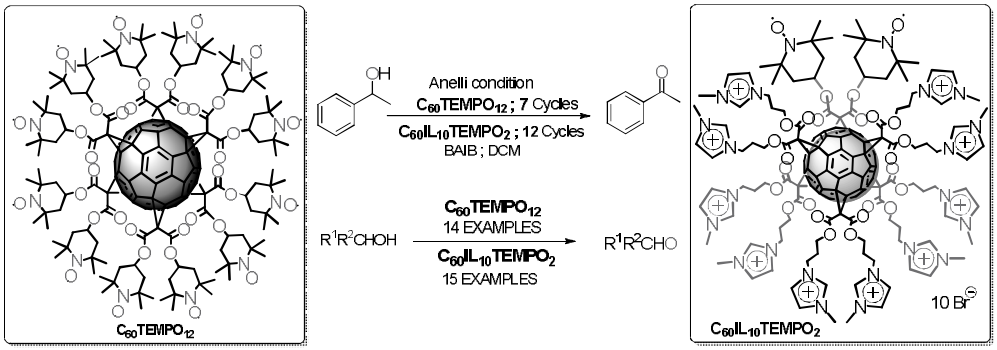

Scheme 1

1-Phenylethanol was oxidized and recycled up to 7 cycles using highly loaded $C_{60}TEMPO_{12}$ catalyst (1 mol%) and quickly isolated by short chromatography whereas, ionic liquid tagged $C_{60}IL_{10}TEMPO_2$ catalyst (1 mol%) was recycled up to 12 cycles by using new class of multilayed covalently supported IL phase (mlc-SILP) materials with 'release and catch' approach.[3] Such catalysts gave good to excellent yields in the oxidation of a wide series of different alcohols to carbonyl compounds with a loading of catalyst between 0.05 and 1 mol% with TON of up to 3000.

References:

[1] Hudlicky, M. *Oxidations in Organic Synthesis*, ACS, Washington DC, **1990**; pp 114-149.

[2] Tebben, L.; Studer, A. *Angew. Chem. Int. Ed.* **2011**, *50*, 5034-5068.

[3] Gruttadauria, M.; Giacalone, F.; Noto, R. *Green Chem.* **2013**, *15*, 2608-2618.