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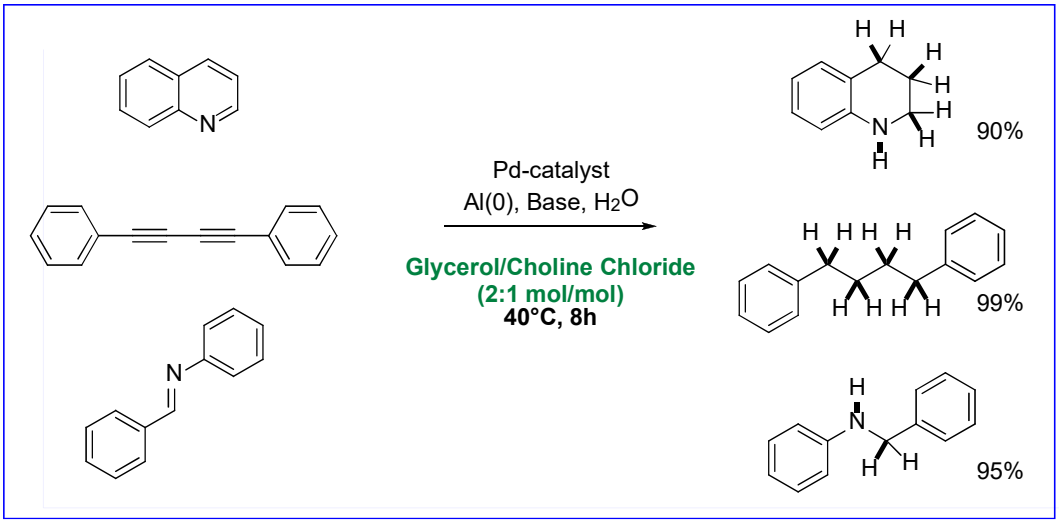
Pd-catalyzed Reductions in Deep Eutectic Solvents by Using Aluminum and Water as Hydrogen Source

Giuseppe Dilauro[a], Serena Perrone[a], Francesco Messa[a], Andrea N. Paparella[a], Antonio Salomone[b]

[a] Dipartimento di Scienze e Tecnologie Biologiche ed Ambientali, Università del Salento, Prov.le Lecce-Monteroni, I-73100 Lecce, Italy; [b] Dipartimento di Chimica, Consorzio C.I.N.M.P.I.S., Università degli Studi di Bari "Aldo Moro", Via E. Orabona 4, I-70125 Bari, Italy

The reduction of organic functional groups, using metal-catalyzed hydrogenations, is one of the most employed strategy in organic chemistry for the synthesis of both fine and bulk chemicals.[1] Hydrogen is an explosive gas and its production needs extensive energy and generates a considerable amount of carbon dioxide. Therefore, the development of cost-effective reduction methods that use safe reagents, environmentally-friendly solvents and prevent or minimize waste formation represents a challenge of great interest in sustainable chemistry. As part of our ongoing efforts in the discovery of sustainable synthetic methodologies,[2] an alternative and safe palladium-catalyzed hydrogenation reaction in Deep Eutectic Solvents (DESs) is here described.[3] The use of aluminum powder in combination with water and a base in DESs, results in an environmentally-responsible system for the controlled *in-situ* generation of hydrogen. Our optimized protocol is effective for the reduction of a wide range of functional groups, containing C–C, C–N, C–O, N–O multiple bonds as well as for the dearomatization of (hetero)aromatic compounds, and leads to the desired products in yield up-to 99%. The simplicity, cost, tunability, scalability and the environmentally benign character of both catalytic system and DESs, offer numerous advantages over the currently available methods that employ external and dangerous H_2 source and harsh, volatile organic solvents.



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