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Chemoselective Addition of Lithium Phosphides to Aldehydes and Epoxides in *Deep Eutectic Solvents*

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Within the arsenal of organic synthesis, the chemistry of compounds of *s*-block elements (typically organolithium and Grignard reagents) has become one of the most useful tools to forge new C–C.[1] Although a variety of synthetic methods has been developed so far to create C–N,[2] C–O[3] and C–S[4] bonds, the number of protocols for the construction of new C–P connections is much more limited. Pioneering, independent studies from Hevia, García-Alvarez, and our own group have shown that the rate of alkylation/arylation of unsaturated functional groups (e.g., carbonyl compounds, imines, double bonds) by highly polar organometallic compounds successfully competes with protonation, when using environmentally responsible protic solvents like water and the so-called *Deep Eutectic Solvents* (*DESs*).[5,6] In this communication, we wish to report that *DESs* can be used as environmentally friendly reaction media to promote a fast (within 3 s reaction time) and chemoselective addition of in-situ generated highly polarized lithium phosphides ($LiPR_2$) to both aldehydes and epoxides, working at room temperature (RT) and under aerobic conditions, thereby granting access to *α*- and *β*-hydroxy-phosphine oxides, respectively, in very good yields (up to 94%, **Figure 1**).[7]

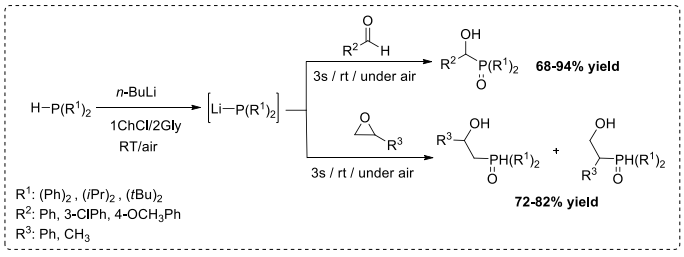

Figure 1. In-situ generation of lithium phosphides and their one-pot chemoselective addition to aldehydes and epoxides, working under air, at RT, in 1ChCl/2Gly mixture. ChCl = choline chloride, Gly = glycerol

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