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Alkali-metal-catalyzed synthesis of isoureas from alcohols and carbodiimides¹

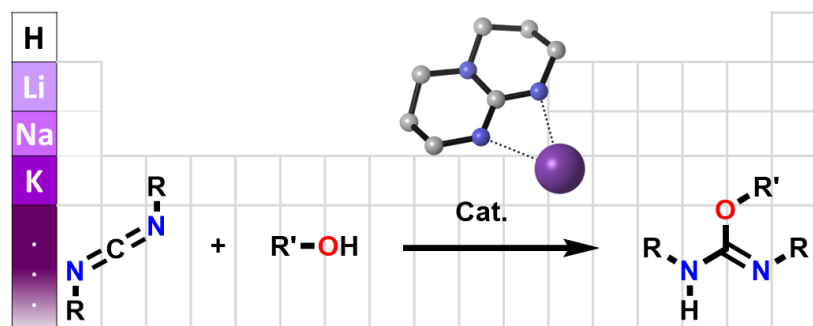
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Axe 3

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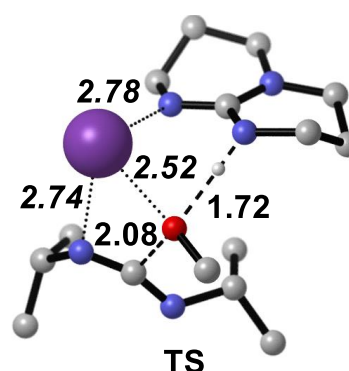
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Current synthetic methods for the formation of isoureas rely on the addition of the alcohol (R'OH) to the corresponding carbodiimide (RN=C=NR). State-of-the-art catalysts rely on transition metal and actinide complexes. Copper (CuCl, CuCl₂, Cu₂O) and zinc (ZnCl₂) salts are reported to act as Lewis acids², able to enhance the electrophilicity of the carbodiimide reagent. Recently, in 2016, Eisen described new actinide complexes³ (U[N(SiMe₃)₂]₃ and [(Me₃Si)₂N]₂An[κ²(N,C)-CH₂Si(CH₃)₂N(SiMe₃)] (An = Th or U)) able to catalyze the formation of isoureas under mild conditions.

Capitalizing on our knowledge on the chemical reactivity of guanidine bases⁴ and alkali metal like Lewis acid, we have recently designed the first alkali metal catalysts able to facilitate the addition of alcohols to carbodiimides.¹ The role and influence of the alkali metal has been investigated by controlling the Lewis acidity of the alkali metal with exogenous ligands. Experimental studies, combined with DFT calculations, offer a new vision on the active role of alkali metal cations in catalysis.



Via :



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