



13/05/2015

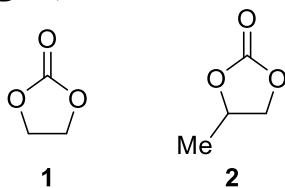
Научный семинар кафедры органической химии

№ 14

Synthesis and applications of cyclic carbonates

Professor Michael North

Solvents play a key role in the pharmaceutical and fine chemicals industries, accounting for most of the mass present in a reaction. There is currently significant interest in developing green replacements for conventional organic solvents and a particular priority is polar aprotic solvents. All conventional polar aprotic solvents (DMF, NMP, DMSO, MeCN, MeNO₂, HMPA etc) contain nitrogen or sulphur which generate NO_x or SO_x on incineration. DMF and NMP are in the process of being banned under REACHH regulations and other conventional solvents are unusable due to excessive toxicity (MeCN) or explosion hazard (MeNO₂). Cyclic carbonates, especially ethylene carbonate **1** and propylene carbonate **2** make excellent polar aprotic solvents, especially propylene carbonate which has extremely low toxicity (and is already used in cosmetics) and a very wide liquid range (-50 to +250 °C).



This presentation will describe the work that we have carried out on the synthesis of cyclic carbonates from epoxides and CO₂, including the use of waste and atmospheric CO₂. Extensive mechanistic studies including kinetics and isotopic labelling experiments have given new insights into the reaction mechanism. The presentation will also illustrate the use of cyclic carbonates **1** and **2** as solvents for a range of catalysed reactions.

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Препараторская СХА, 14-45