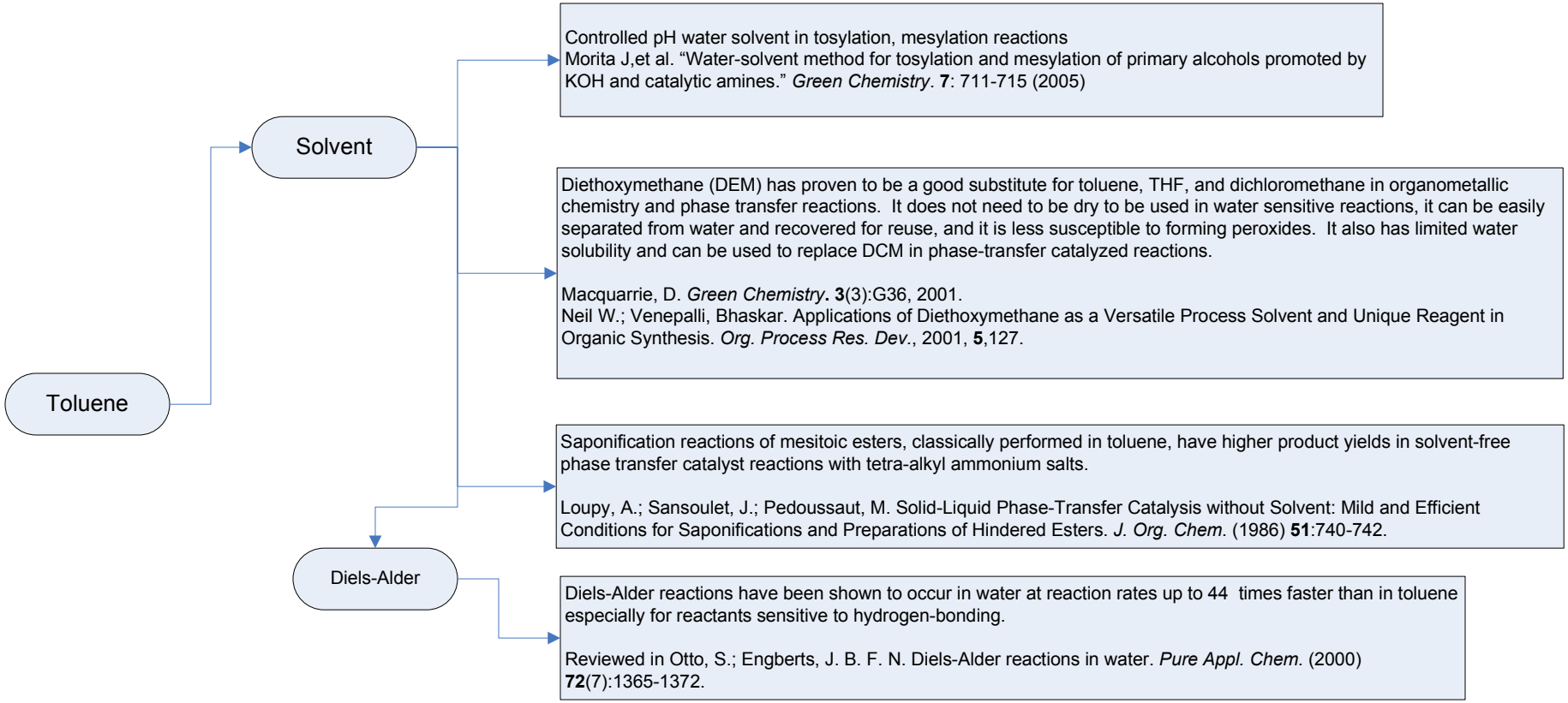
Toluene
Solvent
Diels-Alder
Controlled pH water solvent in tosylation, mesylation reactions
Morita J,et al. “Water-solvent method for tosylation and mesylation of primary alcohols promoted by KOH and catalytic amines.” Green Chemistry. 7: 711-715 (2005)
Diethoxymethane (DEM) has proven to be a good substitute for toluene, THF, and dichloromethane in organometallic chemistry and phase transfer reactions. It does not need to be dry to be used in water sensitive reactions, it can be easily separated from water and recovered for reuse, and it is less susceptible to forming peroxides. It also has limited water solubility and can be used to replace DCM in phase-transfer catalyzed reactions.
Macquarrie, D. Green Chemistry. 3(3):G36, 2001.
Neil W.; Venepalli, Bhaskar. Applications of Diethoxymethane as a Versatile Process Solvent and Unique Reagent in Organic Synthesis. Org. Process Res. Dev., 2001, 5,127.
Saponification reactions of mesitoic esters, classically performed in toluene, have higher product yields in solvent-free phase transfer catalyst reactions with tetra-alkyl ammonium salts.
Loupy, A.; Sansoulet, J.; Pedoussaut, M. Solid-Liquid Phase-Transfer Catalysis without Solvent: Mild and Efficient Conditions for Saponifications and Preparations of Hindered Esters. J. Org. Chem. (1986) 51:740-742.
Diels-Alder reactions have been shown to occur in water at reaction rates up to 44 times faster than in toluene especially for reactants sensitive to hydrogen-bonding.
Reviewed in Otto, S.; Engberts, J. B. F. N. Diels-Alder reactions in water. Pure Appl. Chem. (2000) 72(7):1365-1372.