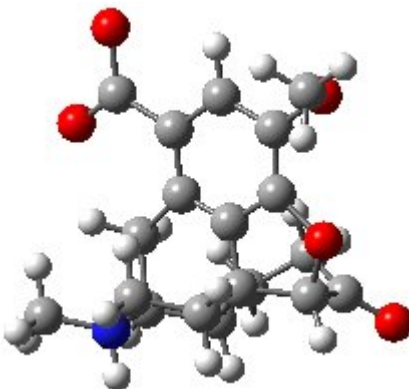


Recent Publications

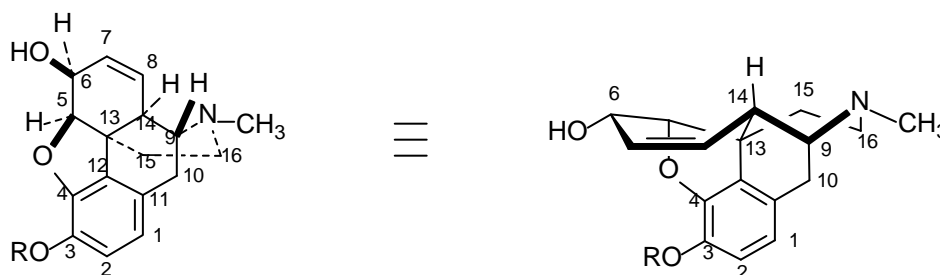
M. L. Wilson, D. R. Dalton and P. J. Carroll, "Decoration of the Aromatic Ring of Dihydrocodeinone (Hydrocodone) and 14-Hydroxydihydrocodeinone (Oxycodone)". *J. Org. Chem.* **2005**, *70*, 6492.



Abstract:

Improved yields of 1-bromodihydrocodeinone (1-bromohydrocodone) and 1-bromo-14-hydroxydihydrocodeinone (1-bromooxycodone) and synthesis of the corresponding 1-chloro and 1-iodo-derivatives have been achieved using the corresponding N-halosuccinimides in acidic milieu. The corresponding 1-carboethoxy derivative of 14-hydroxydihydrocodeinone (1-carboethoxyoxycodone) has been prepared by Pd catalyzed reaction with carbon monoxide in ethanol and hydrolyzed to the corresponding zwitterion.

L. M. Mascavage, M. L. Wilson and D. R. Dalton, "Syntheses of Morphine and Codeine (1992 - 2002): Templates for Exploration of Synthetic Tools." *Current Organic Synthesis* **2006**, 3 99.

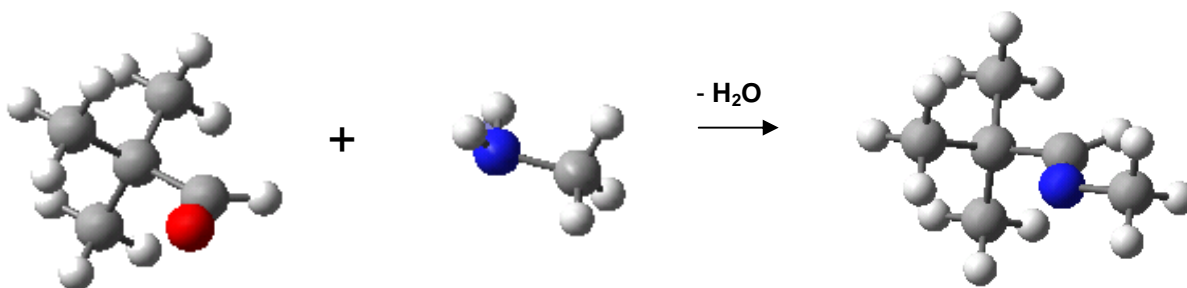


1, R = H; **2**, R = CH₃

Abstract:

Morphine (**1**) and its O-methylated analogue codeine (**2**), analgesic alkaloids of the opium poppy (*Papaver Somniferum*), have been targets of organic chemists engaged in synthetic activities for at least half a century. The “first” (Gates) and “most efficient” (Rice) syntheses of morphine (**1**) and codeine (**2**) are well known and have been reviewed and analyzed extensively numerous times. However, syntheses of the same two alkaloids that have been reported since 1992 and which have been used as devices to advance the art of organic synthesis are not as widely recognized and they have not been as thoroughly reviewed. Here they are analyzed in the spirit of the use of these two compounds as templates. Further, since both racemic and enantiospecific syntheses are important and since all eight (8) approaches (since 1992) are sufficiently different so as to warrant more than superficial examination, they are all considered.

L. M. Mascavage, P. E. Sonnet and D. R. Dalton, "On the Surface-Catalyzed Reaction between the Gases 2,2-Dimethylpropanal and Methanamine. Formation of Active-Site Imines." *J. Org. Chem.* **2006**, (DOI 10.1021/jo052503z) 71.



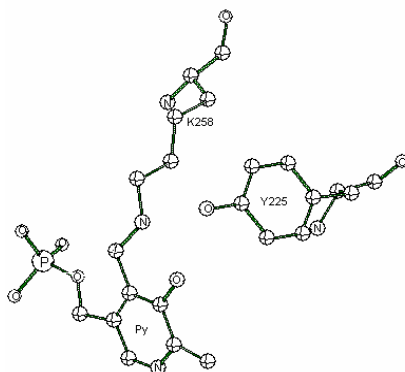
Abstract:

The reaction that occurs when vapors of 2,2-dimethylpropanal and methanamine are allowed to mix in an infrared gas cell has been examined. The disappearance of starting materials and formation of E-imine product, monitored simultaneously, is best fit by a process involving wall associated water. The same or closely related processes have been successfully modeled; such processes may also be common to pyridoxal catalyzed transamination and related reactions in biological systems.

P.E. Sonnet, L.M. Mascavage and D.R. Dalton, "The First Steps. The Attack on the Carbonyl Carbon of Pyridoxal Cofactor in Pyridoxal- Dependent Enzymes." [*Bioorg. Med. Chem. Let.* **2008**,18, 744..](#)

Abstract:

A study of the reaction between gaseous aldehydes and amines has implicated proton transfer from wall-associated water. Carbinolamine formation and subsequent dehydration to imine with assistance by wall associated hydroxyl bearing species has not previously been specifically suggested to obtain in the multitude of enzyme processes using pyridoxal cofactor. However, the data now available make it clear that imine formation in the active site of those systems requires *at least one water or hydroxyl bearing amino acid* for proton transfer.



L.M. Mascavage, F. Zhang-Plasket, P.E. Sonnet and D. R. Dalton, "Gas phase surface-catalyzed HCl addition to vinylacetylene: motion along a catalytic surface. Experiment and theory." *Tetrahedron* **2008** , 64, 9357.

Abstract:

Gaseous mixtures of HCl and vinylacetylene were permitted to react in Pyrex IR cells (NaCl windows). Gaseous 4-chloro-1,2-butadiene and 2-chloro-1,3-butadiene (chloroprene) were the major products. Kinetic data (FT-IR) generated a rate expression in concert with surface catalysis. Computational studies involving surface associated water provide a view that accounts for the experimentally determined orders and a bifurcated pathway producing both products. The results are in accord with wall-adsorbed reactant(s) and previously reported computational studies.

