

Comprehensive Organic Chemistry Experiments for the Laboratory Classroom

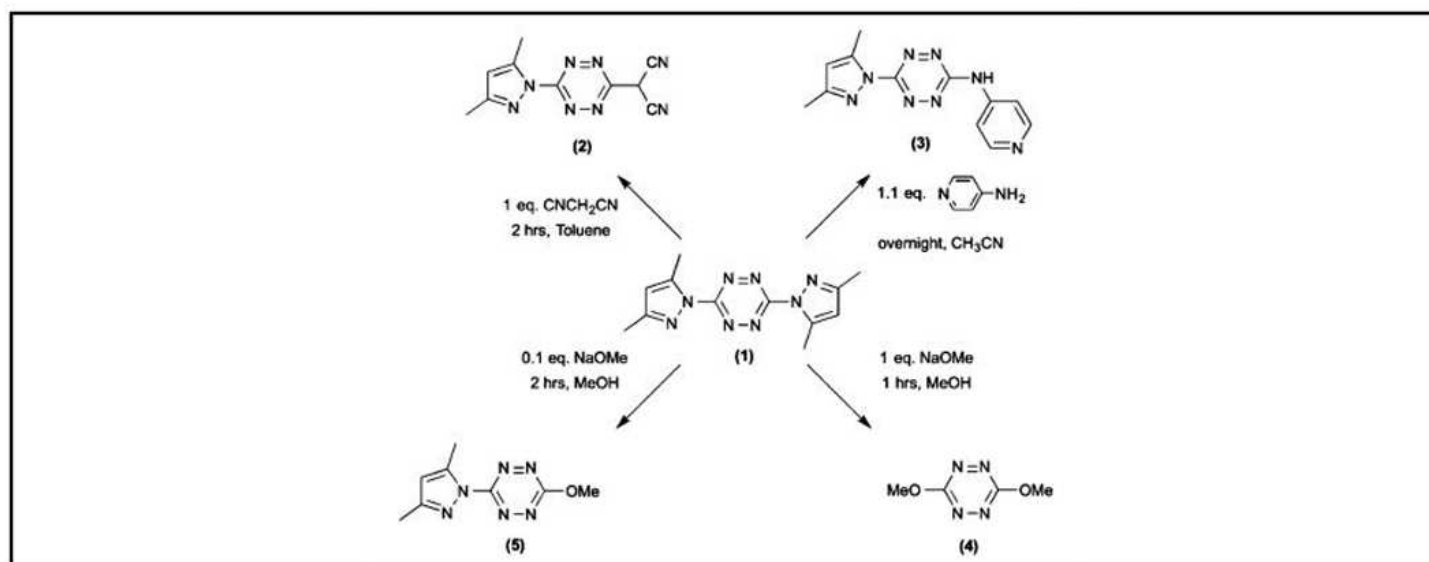
Edited by Carlos A M Afonso, Nuno R Candeias,
Dulce Pereira Simão, Alexandre F Trindade,
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and Robert Franzén



6.5. Nucleophilic Aromatic Substitution Reactions in 3,6-Bis(3,5-dimethyl-1*H*-pyrazol-1-yl)-1,2,4,5-tetrazine

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| Number of sessions (duration of each session) | Hazard level | Difficulty level | Level of study |
|---|--------------|------------------|----------------|
| 3 (4 h each) | Moderate | Medium | Advanced |

Class names Tetrazines, pyrazoles, nitriles, pyridines

Concepts involved This experiment involves four examples of nucleophilic aromatic substitutions in tetrazine rings. The N-, C- and O-nucleophiles chosen have a completely different reactivity, providing the students an easy way to understand the nucleophilicity of the different compounds

Chemicals needed 3,6-Bis(3,5-dimethyl-1*H*-pyrazol-1-yl)-1,2,4,5-tetrazine, 4-aminopyridine, malononitrile, sodium methoxide, acetonitrile, triethylamine, toluene, ethanol, methanol, anhydrous magnesium sulfate, neutral aluminium oxide for chromatography, deuterated chloroform, deuterated acetone, deuterated dimethyl sulfoxide

Equipment and experimental techniques involved Vacuum filtration, liquid-liquid extraction, column chromatography, NMR spectroscopy, laboratory weighing equipment, heating plate with magnetic stirring, rotatory evaporation apparatus, preparative thin-layer chromatography

Keywords Column chromatography, NMR spectroscopy, nucleophilic aromatic substitution, preparative thin-layer chromatography, tetrazines

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