

Preparation of 2,2'-Bipyrazine and 5,5'-Dimethyl-2,2'-Bipyrazine

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Abstract: Procedures to maximize the product yields in the preparation of the title compounds were investigated. The general preparative procedures for 2,2'-bipyrazine (bpz) and 5,5'-dimethyl-2,2'-bipyrazine (Me2bpz) was as follows: Copper(II) salts of 2-pyrazine carboxylic acid (pzCOOH) and 5-methyl-2-pyrazinecarboxylic acid (MepzCOOH) were obtained by reacting copper(II) chloride in water with a stoichiometric quantity of the appropriate acid to give Cu(pzCOO)2 and Cu(MepzCOO)2. The blue solid was removed by filtration, dried in a vacuum oven at 60 °C and then cooled to room temperature. It was then placed in a pyrolysis apparatus and the solid was heated to 300 °C. The products were separated from the remaining solid by a stream of argon gas and deposited on the walls of a condenser. The deposit was then removed and dissolved in acetone. Upon concentration of the material by evaporation of the acetone, it precipitated and was removed by filtration. It was then purified by repeating the process of dissolution in acetone, concentrating it by evaporation of the acetone and collecting the precipitate. The maximum yield of bpz was ~20% and ~2% for Me2bpz. The compounds melted sharply at 167 °C and 138 °C, respectively. Variations in preparative procedures and pyrolysis techniques were examined and product yields were determined. Some of the variations were to add elemental copper to the solid undergoing pyrolysis, changing the stoichiometry of the acid added to the reaction mixture and altering the design of the pyrolysis apparatus.

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