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Synthesis of a Fully Conjugated Linear Diamine as a Potential Rotaxane Component

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SYNTHESIS OF A FULLY CONJUGATED LINEAR DIAMINE AS A POTENTIAL ROTAXANE COMPONENT

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Steps toward the preparation of a fully conjugated linear diamine are described. This diamine will be used as a linear component in the preparation of larger supramolecular species called rotaxanes. Rotaxanes are composed of a ring shaped molecule threaded onto a linear molecule with bulky stoppering groups used to prevent dethreading of the ring (Figure 1). The target rotaxane will be composed of two hexamolybdate ions, a beta-cyclodextrin molecule, and a linear diamine. In the first step of the diamine synthesis, *p*-aminotrimethylsilyl ethynylbenzene was prepared from 4-iodoaniline and trimethylsilyl acetylene according to Figure 2. The trimethylsilyl protecting group allows substitution to occur at only one C-H terminus of the acetylene molecule. In a subsequent step (Figure 3) the trimethylsilyl protecting group was removed from the *p*-aminotrimethylsilyl ethynylbenzene by addition of aqueous potassium hydroxide. In a third step, two equivalents of the newly formed *p*-aminoethynylbenzene will be coupled together to form 4,4'-bis(amino)diphenylbutadiyne (Figure 4).

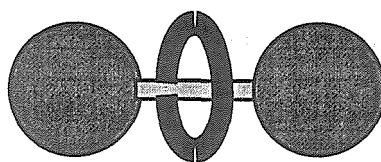


Figure 1

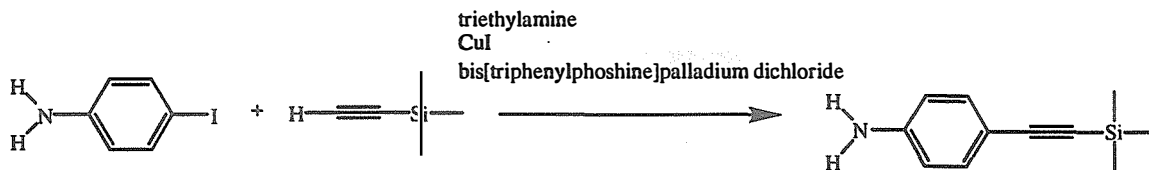


Figure 2

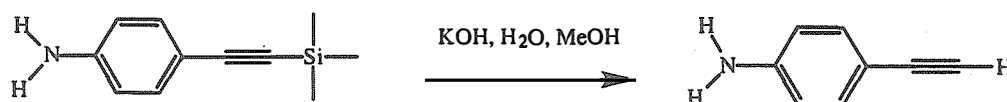


Figure 3

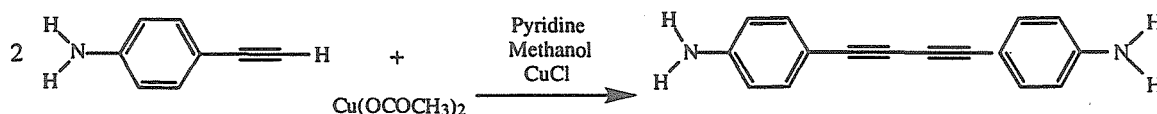


Figure 4