Synthesis of double winding vine-shaped biphenyl

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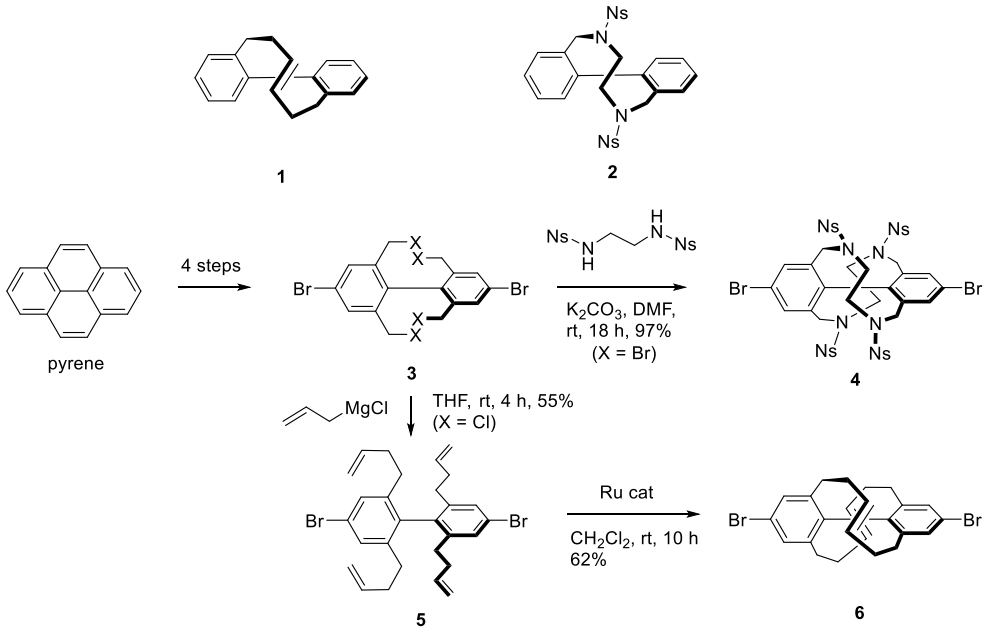
During our ongoing efforts on the preparation of a novel class of compounds showing molecular asymmetry, we have recently shown that winding vine-shaped biphenyl **1** and **2** are synthesized and these molecules have exhibited molecular asymmetry.[1] Our attention has thus focused on the synthesis of double winding vine-shaped molecules.

Biphenyl bearing four halomethyl groups at the 2,2',6,6'-potitions **3** was prepared from pyrene as a starting material. The reaction of **3** (X=Br) with nosyl (Ns: 2-nitrobenzenesulfonyl) ethylenediamine[2] in DMF underwent double cyclization to give winding vine-shaped product **4** in 97% yield. Biphenyl **3** (X=Cl) was subjected to allylation with allylmagnesium chloride to afford quadruply 3-butenylated prouct **5** in 55% yield. Following ring-closing metathesis[3] provided the doubly cyclized product **6** in 62% yield.



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