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Facile Two-Step Synthesis of 1,10-Phenanthroline-Derived Polyaza[7]helicenes with High Fluorescence and CPL Efficiency

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Category

Synthesis of Materials and Unnatural Products

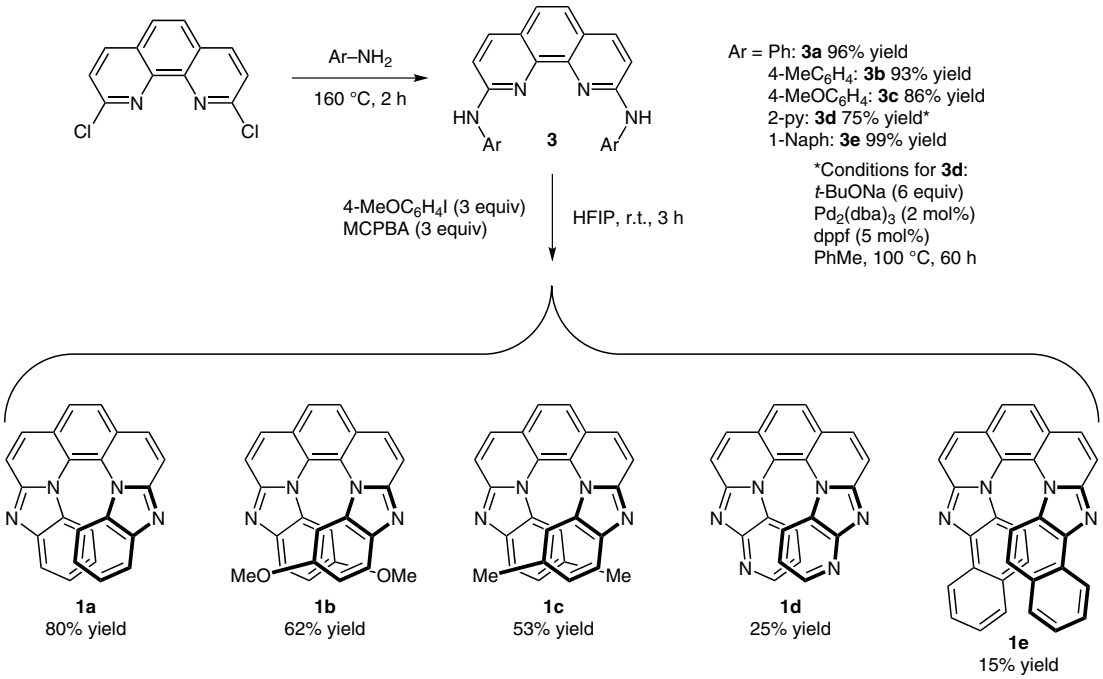
Key words

azaaromatics

fluorescence

circular dichroism

Fluorescent, CPL-Active Aza[7]helicenes in Two Steps



Significance: Helicenes are molecules comprised of *ortho*-fused aromatic rings. They have potential applications in circularly polarized luminescence (CPL) emitting materials because some helicenes show high CPL activities. However, the fluorescence quantum yields of helicenes are generally low because the inherent curved π-systems promote rapid intersystem crossing from the singlet to the triplet states. Herein, Shibata and co-workers report a series of aza[7]helicenes that possess both high fluorescence and CPL activity, which make these molecules an appealing CPL-emitting material.

Comment: The authors report a facile two-step synthesis of aza[7]helicenes. The quantum yield of **1a** (0.39) was comparable to the highest value among reported [7]helicenes (0.40). The addition of acid enhanced the quantum yield of **1a** to 0.80. Although the value of the luminescence dissymmetry ratio g_{lum} of **1a** decreases slightly upon addition of acid (0.009 at 473 nm to 0.008 at 514 nm), this molecule remains an attractive CPL-emitting material. Single-crystal X-ray analysis and DFT calculations on **1a** were also conducted.

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