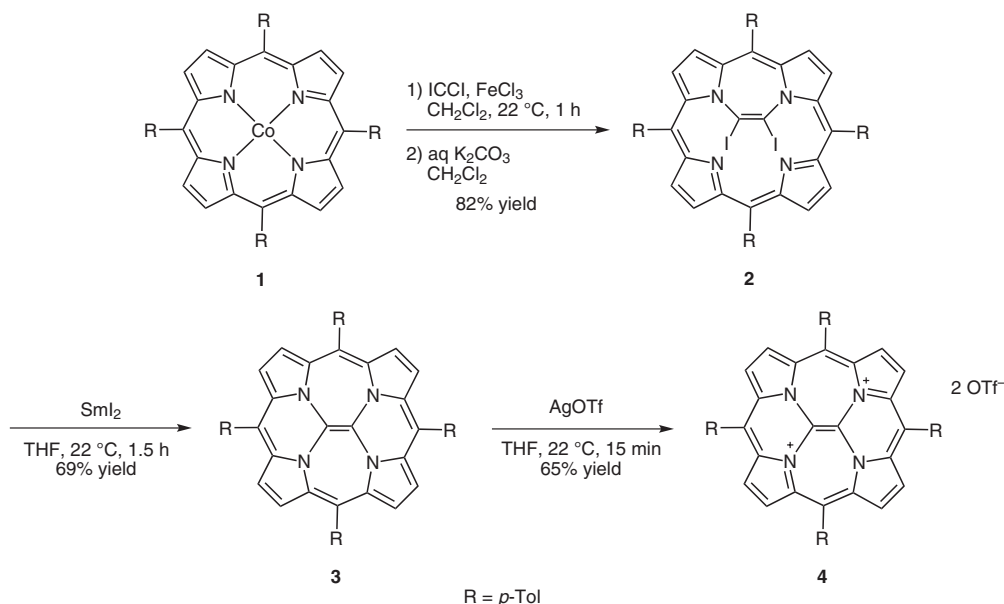


An All-Organic Porphyrin and its Properties



Significance: Reaction of cobalt porphyrin **1** with diiodoacetylene in the presence of FeCl_3 followed by treatment with K_2CO_3 affords compound **2**, which is reduced with SmI_2 to form porphyrin **3**. Characterization of this neutral C=C porphyrin reveals alternating single and double C–C bonds, owing to the antiaromatic properties of the compound. Further, cyclic voltammetry measurements indicate an easy oxidation of **3** to its dicationic, 18π -electron aromatic form. Chemical oxidation of **3** in the presence of AgOTf affords ionic species **4**. NMR measurements and DFT calculations confirm the aromatic character of **4**, that does not possess alternating single and double C–C bonds.

Comment: Although the typical aromatic character of porphyrins is preserved in compound **4**, its electronic structure significantly differs from that of classical metalloporphyrins. In particular, the UV/vis absorbance spectrum of **4** features several intense bands where the single Soret band is usually observed for porphyrins. Such properties make this new type of porphyrins of potential interest for light-harvesting systems.