



## THE *B,N* CHROMOPHORIC SYSTEM

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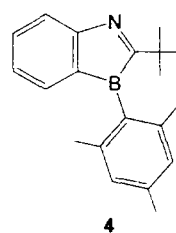
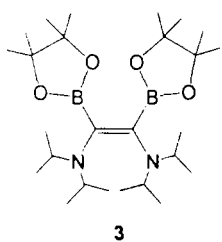
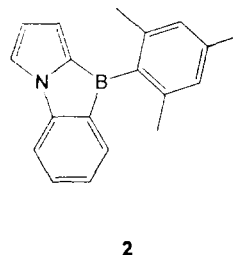
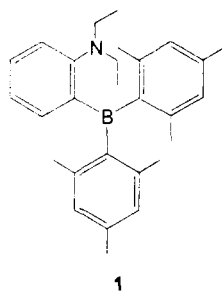
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Polarized  $\pi$ -electron systems are important because they act as chromophors in organic dyes and, furthermore, are of interest as materials with non-linear optical properties used in optoelectronic techniques. Usually, both electron donating and electron withdrawing groups are connected *via* aromatic or conjugated olefinic  $\pi$ -systems, resulting in an internal charge-transfer band in the UV-VIS area.

Based on calculations of their spectroscopic properties we have synthesized three types of organic dyes with different *B,N* chromophoric systems.

In the frequently used triarylmethane dyes, conjugation is transferred over the central carbenium ion. Formally, such a carbenium ion is isoelectronic with an  $sp^2$ -hybridised boron atom and replacement of the former by the latter leads to the novel class of organic dyes **1**. We have developed a general approach to these triarylboranes, beginning with commercially available starting materials. The stability could be increased by the introduction of two sterically demanding mesityl groups at the boron atom.



With the exception of boroles, only little is known about *anti*-aromatic boron heterocycles. Therefore, we became interested in the synthesis and properties of derivatives of the *anti*-aromatic  $8\pi$  electron, bicyclic pentalene and *ab initio* calculations for the parent compound. Combination of nitrogen and boron within the benzopentalene skeleton led to the first 8-borafluorazene derivative **2**.

Indigo is the best known example of a cross-conjugated chromophoric system. Substitution of the carbonyl groups by boron leads to the first example of the parent *cis*-chromophor **3**. A potential type of precursor molecule to a diboraindigo dye is represented by the benzoazaborole **4**.

Especially, the *B,N* dyes of type **1** show a strong fluorescence with very high quantum yields and strong solvatochromic effects.