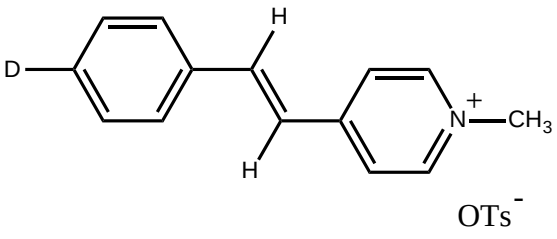
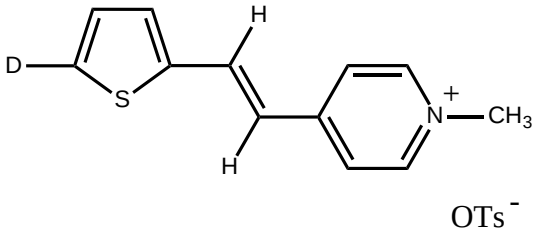
1.1 Nonlinear Optical Properties of Organic Salts Containing Thiophene and Benzothiazolium

(Ch. Serbutoviez and Ch. Bosshard)

Stilbazolium salts **(1)** are a new class of materials for quadratic nonlinear optics. A typical example is 4'-dimethylamino-N-methyl-4-silbazolum tosylate (DAST) which exhibits one of the highest macroscopic nonlinear optical susceptibilities reported so far in the literature. In order to enhance the molecular hyperpolarizabilities of these derivatives we have replaced respectively the phenyl and the pyridinium of the conjugation path of the stilbazolium by a thiophene and a benzothiazolium. Three families of organic salts have been synthesized, they are: Pyridinium 4-(2-(2-thienyl)ethenyl)-1 methyl tosylate **(2)**, Benzothiazolium 2-(2-(phenyl)ethenyl)-3 methyl tosylate **(3)** and Benzothiazolium 2-(2-(2-thienyl)ethenyl)-3 methyl tosylate **(4)** (Fig.1).



1



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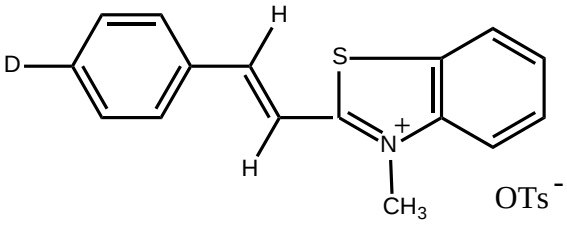

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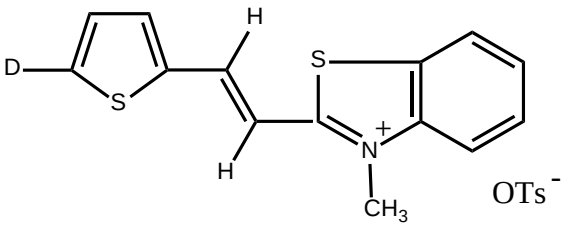

4

D: electron donor group

A set of 25 compounds has been prepared by using different electron donor groups such as dimethylamino, thiomethoxy, methoxy and methyl. From this set of compounds two crystalline materials exhibit a positive second harmonic powder test. At the molecular level, an increase of the molecular extinction coefficient and a bathochromic shift of the charge transfer band have been observed in compounds **1** to **4**. According to the two level model, these results imply to large molecular hyperpolarizabilities. Further investigations will concentrate on the measurement of the molecular hyperpolarizabilities of these organic salts with the new Hyper Rayleigh Scattering Technique.