Naphtho[1,8-*cd*:4,5-*c'd'*]bis[1,2]diselenole

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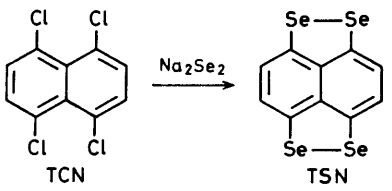
The title compound was synthesized for the preparation of highly conductive organic materials.

Studies on highly conductive organic materials have progressed greatly in recent years.[1] Many donor molecules have been synthesized for the preparation of highly conductive substances. Among these, the complexes of naphthaceno[5,6-*cd*:11,12-*c'd'*]bis[1,2]dithiole (TTT) are known to be highly conductive.[2,3] Analogues of TTT show promise as donor molecules in this field. Wudl *et al.* synthesized naphtho[1,8-*cd*:4,5-*c'd'*]bis[1,2]dithiole (TTN) and found its complex with tetra-



(1)

cyanoquinodimethane to be very conductive.[4] We have now synthesized the selenium analogue of TTN, naphtho[1,8-*cd*:4,5-*c'd'*]bis[1,2]diselenole (TSN) [reaction (1)].

1,4,5,8-Tetrachloronaphthalene (TCN) was prepared by previously reported methods[5] and used in the synthesis of TSN as follows. Sodium (0.8 g) and selenium (2.84 g) reacted in *N*,*N*-dimethylformamide (DMF, 80 ml) for 2 h at 100 °C under nitrogen and then a DMF (80 ml) solution of TCN (2 g), through which nitrogen gas had been passed beforehand, was added dropwise with stirring at 100 °C under nitrogen. This mixture was further stirred for 8 h at 100—110 °C under nitrogen, and left at room temp. overnight. Inorganic substances were filtered off, and the filtrate was evaporated to dryness *in vacuo*. The residue was washed first with water, then acetone, and finally with benzene to eliminate by-products (mainly 1-chloro-4,5-diselenanaphthalene) and extracted with 1,2,4-trichlorobenzene, followed by evaporation to dryness *in vacuo*. The resulting solid was washed with benzene to give TSN as a dark brown powder,† (80 mg, 2.5% yield based on TCN). Syntheses of charge-transfer complexes of TSN are now underway.

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References

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† For TSN the elemental analysis was satisfactory; m.p. 180 °C (decomp.); the mass spectrum of the parent ion of TSN showed an isotope pattern identical with that calculated. Electrochemical half-wave potentials were measured *vs.* the saturated calomel electrode (S.C.E.) at a Pt-electrode in benzonitrile–$Bu^n_4NClO_4$ (0.1 M) [$E_{1/2}$ (1) = 0.40 V *vs.* S.C.E.]; λ_{max} (log ϵ) 256.5 (3.94), 415 (3.88), and 436.5 nm (3.96).