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## Molecular Crystals and Liquid Crystals

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### Preparation and Properties of Some New 1-D Solids

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(Proceedings of the International Conference on Low-Dimensional Conductors, Boulder, Colorado, August 1981)

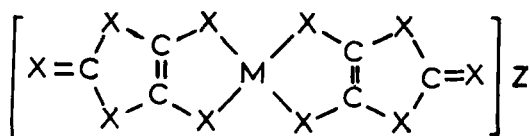
## PREPARATION AND PROPERTIES OF SOME NEW 1-D SOLIDS

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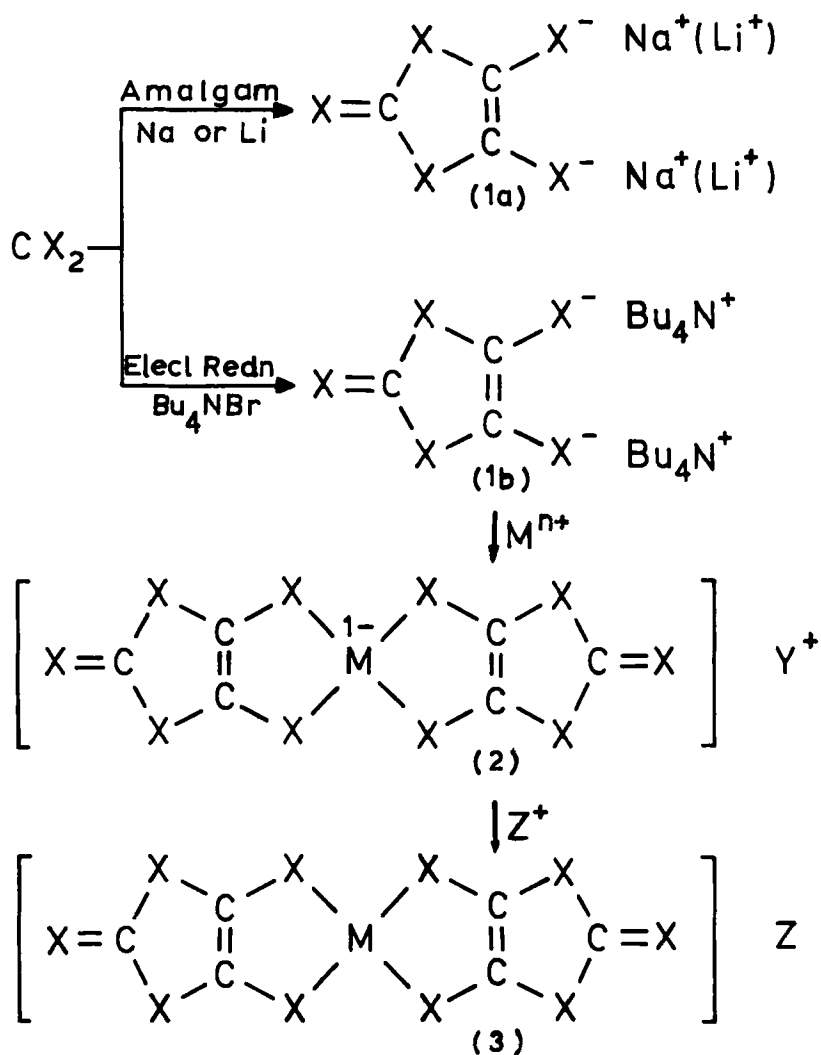
The preparation and the properties of some new 1-D solids with the general formula



(where X= S or Se, M= Ni, Pt, Pd.etc., Z= TTF, TSeF, etc.) have been reported.

The preparation, the crystal structure and the properties of 1-D solids having a metal 1,2-dithiolene (as  $\pi$ -acceptor) and an organic molecule (as  $\pi$ -donor) have been published in a number of papers (see [1] - [5] and references therein). The 1,2-dithiolene ligands were of the type  $\text{S(R)C}=\text{C(R)S}^-$  (where R= H,  $\text{CH}_3$ , CN,  $\text{CF}_3$ , etc.). In this paper we report some new of the same kind solids with 2-thio-xo-1,3-dithiol-4,5-dithiolene and the selenium analog as ligands [6] - [8]. These compounds were prepared by using  $\text{CS}_2$  or  $\text{CSe}_2$  as starting materials.

The following scheme shows the method of preparation [8] .



X= S or Se, M= Ni, Pt, Pd etc., Y= Na, Li, Bu<sub>4</sub>N, Z=TTF or TSeF. We have also prepared compounds (1b) and

(2) with  $\text{NH}_4^+$  or  $\text{Et}_4\text{N}^+$  instead of  $\text{Bu}_4\text{N}^+$  and compounds (3) with  $(\text{TTF})_{1.2}$ ,  $(\text{TSeT})_{1.2}$  or  $(\text{Perylene})_2$  instead of TTF. Last compound has been prepared by electrochemical oxidation of perylene [5] in a dichloromethane solution containing (1b).

Compounds (1) have been isolated as red crystalline solids, soluble in methanol, acetone and insoluble in water. The main feature of these compounds is the strong solvent effect in their optical absorption spectra. Compounds (2) are crystallized in needles or plates and are soluble in methanol and acetone and insoluble in water. These are semiconductors as other similar compounds [9], [10] and become conductors after doping with iodine. Compounds (3) are black powders insoluble in organic solvents. These are good conductors having a dc-conductivity in polycrystalline pellets ca 10 times higher than that of compounds with other 1,2-dithiolenes as ligands [1]-[5]. Their conductivity is of the same order as that of TTF-TCNQ pellet ( $\sigma > 100 \Omega^{-1} \text{ cm}^{-1}$ ). The reflectance spectra of (3) in polycrystalline pellets show Drude edges in the near infrared region as TTF-TCNQ.

A comprehensive article concerning measurements on single crystals will be published elsewhere.

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