

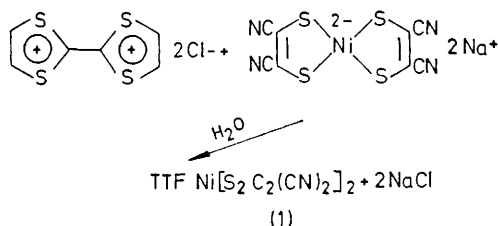
2,2'-Bi-1,3-dithiolyliumnickel Bismaleonitriledithiolate

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Summary The title compound exhibits a room-temperature compressed-pellet electrical conductivity which is 10^5 times higher than that of $\text{NaNi}[\text{S}_2\text{C}_2(\text{CN})_2]_2$.

THE discovery of the unusual electrical properties of the 2,2'-bi-1,3-dithiolylium ion[†] (TTF[†]) generated great interest in this material.³ We report here the first example of a novel TTF salt of a chelated metal anion.



TTF[†] is a very stable, easily formed, radical cation.³ It has also been known for some time that certain transition-metal-dithiolene complexes form stable radical anions.⁴ These dithiolene complexes also form a series of stable compounds of different oxidation states at the central metal ion (*e.g.*, in the Ni, Pd, Pt triad, the 0, -1, -2 charged species are well known.⁴ Since several compounds of the Ni, Pd, Pt family,⁵ especially certain complex salts of

Pt⁵, exhibit unusual electrical properties (one-dimensional conductors), we examined the effect of TTF[†] on the electrical conductivity of $\text{Ni}[\text{S}_2\text{C}_2(\text{CN})_2]_2^-$.

The title compound was prepared *via* the redox reaction (1).

The species TTF²⁺ 2Cl⁻ was prepared from TTF as described previously.³ Crude compound (1) precipitated as a microcrystalline black powder. Analytically pure (1) was obtained *via* multiple extractions with acetone.

The e.s.r. spectrum of (1) in acetone consisted of two signals: a quintet at $g = 2.0085$ (FTTF[†])⁴ and a single line⁵ at $g = 2.0623$ G ($\text{Ni}[\text{S}_2\text{C}_2(\text{CN})_2]^-$), integrated ratio 1:1. The observation of such a clean two-signal spectrum indicates that (1) exists as a solvent-separated ion pair in acetone at room temperature.

The room-temperature compressed-pellet electrical resistivity of (1) was determined to be $2 \times 10^3 \Omega \text{ cm}$. This value is *ca.* 10^5 lower than that of $\text{Na}^+\text{Ni}[\text{S}_2\text{C}_2(\text{CN})_2]_2^-$ ($4 \times 10^8 \Omega \text{ cm}$) indicating a profound effect of TTF[†] on the electrical conductivity.

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† Satisfactory analytical data were obtained for this compound.

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