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NOTES

Some Molecular Adducts of Telluracylopentane-1,1-diiodide

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Some molecular adducts of telluracyclopentane-1,1-diiodide, $(CH_2)_4TeI_2$ of the type $(CH_2)_4TeI_2 \cdot L$ (where L = pyridine-N-oxide, 4-picoline-N-oxide, 2,6-lutidine-N-oxide, triphenylphosphine oxide and tetramethylene sulphoxide) have been prepared and characterised by elemental analysis, conductivity, IR and X-ray photoelectron spectral data.

Although a large number of organotellurium(IV) compounds are reported[1], the telluracyclopentane-1,1-diiodide compounds are relatively less known[2]. This paper describes the synthesis and the characterisation of telluracyclopentane-1,1-diiodide molecular adducts.

Telluracyclopentane-1,1-diiodide was prepared, purified and characterised according to literature procedure[3].

1 Mmol of telluracyclopentane-1,1-diiodide dissolved in excess of acetone (20 ml) was refluxed for 3–4 hrs. with 2 mmol of pyridine-N-oxide (PyO), 4-picoline-N-oxide (4PicO) 2,6-lutidine-N-oxide, (LtO) triphenylphosphine oxide or tetramethylene sulphoxide. The solution was then distilled off and concentrated solution was allowed to stay overnight in the deep freeze. The crystals obtained were washed with petroleum ether (60–80°C) and dried in vacuum.

The X-ray photoelectron spectra were recorded on a VG Scientific ESCA-MK-II electron spectrometer. The MgK_α X-ray line (1253.6 eV) was used for photoexcitation. The Cu $^2p_{3/2}$ (BE = 932.8 ± 0.2) and Au $^4f_{7/2}$ (BE = 83.8 ± 0.1 eV) lines were used to calibrate the instrument and Ag $^3d_{5/2}$ (BE = 368.2 eV) was used for cross-checking[4].

All these molecular adducts are stable with high melting points. Elemental analyses were ±0.5% for C, H, N and I. The molar conductance data of below than 60 ohm^{-1} in DMF suggest that all these adducts are nonelectrolyte[5] with composition of $(CH_2)_4TeI_2 \cdot 2L$.

The IR $\nu_{str.\ N-O}$ in free bases (PyO, LtO and 4-PicO) around 1265–1245 cm^{-1}, shifted to 1210–1215 cm^{-1} on complexation[6–8]. This decrease in the frequency of ν_{N-O} in the molecular adducts as compared to the free base is attributed to the coordination of the oxygen atom of the bases to the tellurium metal causing a decrease in π-character of the N–O bond[9–11]. The IR $\nu_{str.\ P-O}$ vibration in free base triphenylphosphine oxide around 1192 cm^{-1}, moves to a lower frequency in molecular adduct[12,13], showing coordination of triphenyl-

phosphine oxide to the tellurium metal ion through its oxygen atom. The IR $\nu_{str.\ S-O}$ vibration in free base tetramethylene sulphoxide around 1020 cm^{-1},[14] disappears in molecular adducts and a new band with enhanced intensity appears at 970–915 cm^{-1} region, showing coordination of tellurium metal ion through its oxygen atom[15]. The bands at 320 cm^{-1} and 560–540 cm^{-1} in all these molecular adducts may be assigned to ν_{Te-O}[16] and ν_{Te-C}[17] respectively.

The binding energy data of Te $^3d_{3/2}$ and Te $^3d_{5/2}$ photoelectron peaks for $(CH_2)_4TeI_2$ were observed at 583.4 eV and 573.2 eV respectively, higher than their molecular adducts, $(CH_2)_4TeI_2 \cdot 2L$, 582.8 eV and 572.8 eV. From these XPS data one can conclude that all these bases are coordinated to tellurium metal ion[18].

On the basis of the above data a structure $(CH_2)_4TeI_2 \leftarrow 2L$ is proposed to all these molecular adducts.

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