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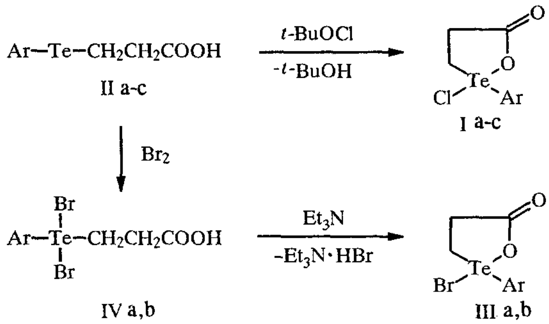
TETRACOORDINATED DERIVATIVES OF 1-OXA-2-TELLURACYCLOPENTANE

V. L. Nivorozhkin, I. D. Sadekov, and V. I. Minkin

We have recently accomplished the synthesis of tetracoordinated new tellurium heterocyclic systems, namely, 5H-1,2-oxatellurole [1] and 3H-benzoxatellurole-2,1 [1, 2]. The reactions used for the preparation of these compounds are also suitable for the synthesis of tetracoordinated derivatives of 1-oxa-2-telluracyclopentane (3,4-dihydro-5H-1,2-oxatellurole).

Products Ia-Ic were obtained by the oxidation of β-aryltelluropropionic acids IIa-IIc [3] by tert-butyl hypochlorite in $CHCl_3$. The synthesis of bromine analogs IIIa and IIIb was carried out by the dehydrobromination of tellurium dibromides IVa and IVb by triethylamine in toluene.



I—IV a Ar = 4-$EtOC_6H_4$, b Ar = 4-MeC_6H_4, c Ar = Ph

The composition and structure of the compounds synthesized were supported by elemental analysis and PMR and IR spectroscopy.

2-(4-Ethoxyphenyl)-2-chloro-1-oxa-2-telluracyclopentan-5-one (Ia, $C_{11}H_{13}ClO_3Te$). A solution of 1.08 g (10 mmoles) tert-BuOCl in 10 ml chloroform was added slowly to a solution of 3.22 g (10 mmoles) β-(4-ethoxyphenyltelluro)propionic acid IIa in 30 ml dry chloroform. After 10 min stirring at room temperature, 50 ml water was added and the mixture was vigorously agitated. The chloroform layer was separated and dried over $MgSO_4$. The solvent was distilled off at reduced pressure. The oily residue was crystallized by trituration with hexane to give colorless crystals, mp 161-162°C (from methanol). IR spectrum (Vaseline mull): 1670 cm^{-1} (C=O). PMR spectrum in $CDCl_3$: 1.45 (3H, t, $OCH_2\underline{CH_3}$), 2.72, 3.15, 3.47, 3.72 (4H, m, m, m, m, CH_2CH_2), 4.08 (2H, q, $O\underline{CH_2}CH_3$), 7.07 (2H, d, 3-H, 5-H), 7.90 ppm (2H, d, 2-H, 6-H). The yield of Ia was 90%. Products Ib and Ic were synthesized by analogous procedures.

2-(4-Methylphenyl)-2-chloro-1-oxa-2-telluracyclopentan-5-one (Ib, $C_{10}H_{11}ClO_2Te$) was obtained in 92% yield as colorless crystals, mp 183-184°C

2-Phenyl-2-chloro-1-oxa-2-telluracyclopentan-5-one (Ic, $C_9H_9ClO_2Te$) was obtained in 94% yield as colorless crystals, mp 131-133°C.

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2-(4-Ethoxyphenyl)-2-bromo-1-oxa-2-telluracyclopentan-5-one (IIIa, $C_{11}H_{13}BrO_3Te$). A solution of 1.01 g (10 mmoles) triethylamine in 10 ml toluene was added slowly with stirring to a solution of 4.82 g (10 mmoles) β-(4-ethoxyphenyldibromotelluro)propionic acid IVa in 10 ml dry toluene. After 20 min stirring at 60-70°C, the mixture was cooled. The triethylamine hydrobromide precipitate was filtered off and the solvent was removed. The residue was washed with hexane, dried, and recrystallized from benzene–hexane to give colorless crystals, mp 168-169°C. PMR spectrum in DMF-d_7: 1.21 (3H, t, $OCH_2\underline{CH_3}$), 2.65, 2.88, 3.34, 3.45 (4H, m, m, m, m, CH_2CH_2), 3.97 (2H, q, $O\underline{CH_2}CH_3$), 7.00 (2H, d, 3-H, 5-H), 7.71 ppm (2H, d, 2-H, 6-H). The yield of IIIa was 4.62 g (96%). Bromide IIIb was analogously prepared.

2-(4-Methylphenyl)-2-bromo-1-oxa-2-telluacyclopentan-5-one (IIIb, $C_{10}H_{11}BrO_2Te$) was obtained in 93% yield as colorless crystals.

The elemental analysis data for these products corresponded to the calculated values.

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