

Preliminary communication

Optically active bis(methyl-1-naphthylphenylgermyl)mercury

V.M. VODOLAZSKAYA, B.V. FEDOT'EV, Yu I. BAUKOV, O.A. KRUGLAYA and N.S. VYAZANKIN

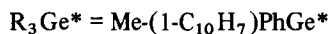
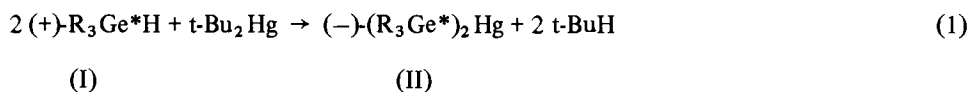
Institute of Chemistry of the Academy of Sciences of the USSR, Gorky (U.S.S.R.) and Chemistry Department, M.V. Lomonosov State University, Moscow (U.S.S.R.)

(Received October 9th, 1973)

SUMMARY

(–)-Bis(methyl-1-naphthylgermyl)mercury has been synthesised through the action of optically active (+)-methyl-1-naphthylphenylgermane on di-tert-butylmercury. The germylmercury compound enters into an exchange reaction with Hg(CH₂COOMe)₂. This includes a demercuration step and is stereospecific.

The reaction of (+)-methyl-1-naphthylphenylgermane (I) with di-tert-butylmercury has given us (–)-bis(methyl-1-naphthylphenylgermyl)mercury (II), the first example of an optically active germylmercury derivative.

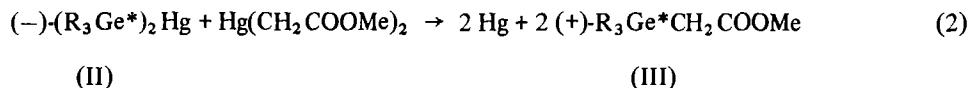


This reaction, like all the reactions described for optically active (I), may involve predominant retention of configuration at germanium. It proceeds via either a four-centre transition state or a pyramidal organogermyl radical¹ and resembles the reaction of (–)-methyl-1-naphthylphenylsilane with dibenzylmercury resulting in (+)-bis(methyl-1-naphthylsilyl)mercury².

The compound (+)-(I) (1 g, 0.0034 mole, [α]_D + 16.1°) was heated with di-tert-butylmercury (0.59 g, 0.0019 mole, m.p. 56–58°) at 80° in 3 ml hexane in an evacuated system for eight hours, to give colourless crystals of (–)-(II), 0.84 g (63%) m.p. 139.5°, [α]_D –0.6° (benzene). (Found: C 51.85, H 3.90, Hg 25.40. C₃₄H₃₀Ge₂Hg calcd.: C 52.06, H 3.86, Hg 25.27%).

The reaction of (–)-(II) with methylmercury bisacetate goes under mild conditions

and yields (+)- $R_3Ge^*CH_2COOMe$ (III) which retains the configuration at germanium (the stereochemical assignment is based on the fact that (+)- R_3Ge^*H and (+)-(III) have identical configurations)³.



1.26 g (0.0016 mole) of (-)-(II) (synthesised from (+)-(I) (1.3 g, 0.0044 mole, $[\alpha]_D +16.1^\circ$) and di-tert-butylmercury (0.71 g, 0.0023 mole)) were treated with methylmercury bisacetate (0.73 g, 0.0021 mole) in 4 ml tetrahydrofuran in an evacuated system at room temperature for nine days, to give 0.56 g (87%) of mercury and 1.1 g of (+)-(III) containing ca. 20% $(R_3Ge^*)_2O$. Chromatography on silica gel gave pure (+)-(III) (oil, 0.59 g (50%), $[\alpha]_D +1.88^\circ$ (cyclohexane)). Its IR and PMR spectra correspond to those reported earlier³.

REFERENCES

- 1 H. Sakurai and K. Mochida, *Chem. Commun.*, (1971) 1581.
- 2 C. Eaborn, R.A. Jackson and M.T. Rahman, *J. Organometal. Chem.*, 34 (1972) 7.
- 3 V.M. Vodolazskaya and Yu.I. Baukov, *Zh. Obshch. Khim.*, 43 (1973) 1410.