As was to be expected[1,2] compounds in the β-naphthoquinone series possess greater antioxygenic activity than the analogous α-naphthoquinones but they are less active than corresponding benzoquinones. Thus, β-lapachone is only about one-fifth as effective as the pyrano-*o*-quinone derived from α-tocopherol. Since β-lapachone is much less effective than α-naphthoquinone, it is doubtful that the chroman ring of the former contributes to its antioxygenic action; in the benzene series the presence of a chroman ring markedly increases antioxygenic activity.

Obviously, no relation exists between antihemorrhagic and antioxygenic activity.

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Some Addition Compounds of Morpholine

BY HELMUT M. HAENDLER AND GEORGE McP. SMITH

During an investigation of dithiane addition compounds of various inorganic substances,[1] it was suggested that morpholine, C_4H_9NO, might form similar complexes. Consequently, several representative addition compounds of zinc, cadmium and mercuric halides have been prepared. These compounds are white, crystalline, soluble in *aqua regia* with decomposition and slowly soluble in water, also with decomposition. In all compounds prepared, there are two moles of morpholine per mole of halide, in contrast to dioxane compounds, reported first by Rheinboldt, Luyken and Schmittmann,[2] of which only the zinc compounds are analogous, and to dithiane complexes.[1]

The addition compounds were prepared by direct reaction between the halide and excess morpholine at the boiling point of the latter. After cooling, the crystals were centrifuged rapidly, washed with absolute alcohol and ether and dried in a vacuum desiccator. In some cases, the inorganic halide was dissolved in absolute alcohol and then added to the morpholine. Addition compounds of morpholine and cupric halides are extremely sensitive to moisture, decomposing rapidly. Morpholine also appears to react with cobalt and cupric chloride in hydrochloric acid solution.

The experimental data are summarized in Table I. Zinc and cadmium were determined as anthranilate, mercury as $[Cu(en_2)]HgI_4$.

TABLE I

ADDITION COMPOUNDS OF MORPHOLINE

Formula	M. p., °C.	Metal analyses, % Calcd.	Metal analyses, % Found
$ZnCl_2 \cdot 2C_4H_9NO^a$	Softens 200–210, then melts	21.1	21.0
$ZnBr_2 \cdot 2C_4H_9NO^a$	Dec. 230–240	16.4	16.3
$CdCl_2 \cdot 2C_4H_9NO^a$	...	31.4	32.2
$CdBr_2 \cdot 2C_4H_9NO$	Dec. 250–252	25.2	24.8
$CdI_2 \cdot 2C_4H_9NO$	Dec. 205–210	20.8	20.8
$HgCl_2 \cdot 2C_4H_9NO$	...	45.0	45.8
$HgBr_2 \cdot 2C_4H_9NO$	Dec. 131–135	37.5	37.4

[a] Inorganic halide dissolved in absolute alcohol.

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[1] Bouknight and Smith, THIS JOURNAL, **61**, 28 (1939).

[2] Rheinboldt, Luyken and Schmittmann, *J. prakt. Chem.*, **149**, 30 (1937).

Investigations in the 1-Methylphenanthrene Series. I. The Conversion of Retene into 1-Methylphenanthrene

BY TORSTEN HASSELSTROM

A direct removal of the isopropyl group from the retene nucleus has been carried out successfully by refluxing retene with fuller's earth whereby 1-methylphenanthrene is obtained in satisfactory yields, together with propene. In this reaction a liquid hydrocarbon which was not investigated at this time is obtained as a by-product. The 1-methylphenanthrene was characterized through its picrate, quinone and phenazine prepared in the conventional manner. The melting points of the hydrocarbon and its derivatives agree, with exception of the phenazine, with those obtained by Pschorr[1] and Haworth[2] on the corresponding material obtained by complete synthesis.

The propene obtained in this reaction was absorbed in bromine and identified as propylene bromide.

Since retene is present in pine wood tar and can be obtained from abietic acid through dehydrogenation, 1-methylphenanthrene is easily produced from these natural products; it thus can

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[1] Pschorr, *Ber.*, **39**, 3111 (1908).

[2] Haworth, *J. Chem. Soc.*, 1125 (1932).