



This work records the first selective reaction involving a 2'-hydroxyl as the major site of reaction in an unprotected naturally occurring  $\beta$ -D-ribofuranosyl nucleoside. The suitable blocking of the 2'-hydroxyl by a group which can be removed subsequently under adequately mild conditions has been one of the major problems of oligo- and polynucleotide chemistry.<sup>14</sup> The possibility that such a group (benzyl) might be introduced directly *via* phenyldiazomethane and removed later by catalytic reductive hydrogenolysis<sup>15</sup> is a prospect presently under active investigation in our laboratory.

The biochemical function of the 2'-O-methylnucleosides is as yet unknown.<sup>8</sup> Honjo and co-workers<sup>16</sup> have found that 2'-O-methylribonucleotides behave differently from the corresponding ribonucleotides toward a variety of enzymatic systems. Work is presently in progress to see if this selective reaction with diazomethane can be utilized for the synthesis of additional naturally occurring 2'-O-methylnucleosides of current biochemical interest.

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(16) M. Honjo, Y. Kanai, Y. Furukawa, Y. Mizuno, and Y. Sanno, *Biochim. Biophys. Acta*, **87**, 698 (1964).

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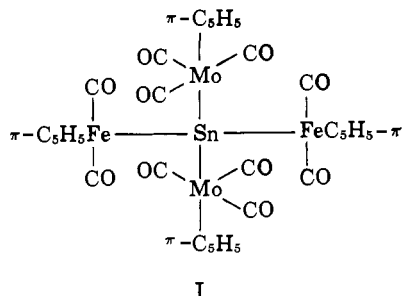
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## An Organometal Compound Containing Five Metal Atoms

Sir:

In a previous communication<sup>1</sup> we described the synthesis of an organometal carbonyl compound containing three different metals covalently bonded. We now wish to report the synthesis of a new, soluble, organometal compound (I) containing a cluster of five metal atoms—two Mo and two Fe atoms covalently bonded to a central Sn atom.



I, bis[ $\pi$ -cyclopentadienyldicarbonyliron]bis[ $\pi$ -cyclopentadienyltricarboxymolybdenum]tin(IV), was prepared as follows. A tetrahydrofuran solution (40 ml.) of sodium  $\pi$ -cyclopentadienyltricarboxymolybdate(-I),<sup>2</sup> Na[ $\pi$ -CpMo(CO)<sub>3</sub>] (II), 10 mmoles, was prepared in a three-necked flask fitted with a stirrer, a

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reflux condenser, and a nitrogen inlet tube. To the yellow solution in the flask was added a THF solution (75 ml.) of dichlorobis( $\pi$ -cyclopentadienyldicarbonyliron)tin(IV),<sup>3</sup> [ $\pi$ -CpFe(CO)<sub>2</sub>]<sub>2</sub>SnCl<sub>2</sub> (III), 5 mmoles, and the resulting red solution was stirred and refluxed for 24 hr. under an atmosphere of nitrogen. After cooling to room temperature, the solution was filtered quickly and the solvent removed from the filtrate in a rotary evaporator. Dichloromethane (75 ml.) and some pentane (20 ml.) were added to the residue. The mixture was filtered and the filtrate stored under nitrogen. A small amount of insoluble material appeared, which was filtered under carbon monoxide, and the filtrate was stored under carbon monoxide in the cold. On standing, a red-orange crystalline precipitate (0.567 g.) was obtained. The crystals were separated and recrystallized under carbon monoxide from a minimum amount of dichloromethane.

When it crystallizes in relatively larger crystals, I appears to be deep red; as small crystals, it appears orange. It does not melt, but on heating the color changes to brown between 140 and 150° and to black between 215 and 220°.

*Anal.* Calcd. for C<sub>30</sub>H<sub>20</sub>Fe<sub>2</sub>Mo<sub>2</sub>SnO<sub>10</sub>: C, 37.42; H, 2.09; mol. wt., 962. Found<sup>4</sup>: C, 37.52; H, 2.20; mol. wt.,<sup>5</sup> 947.

The X-ray emission spectrum showed bands corresponding to Sn: K $\beta$ <sub>1</sub> at 12.41°; K $\alpha$ , K $\alpha$ <sub>1</sub> at 14.0–14.12°; Mo: K $\beta$ , K $\beta$ <sub>1</sub> at 18.08° and K $\alpha$ , K $\alpha$ <sub>1</sub>, K $\alpha$ <sub>2</sub> at 20.29–20.41°; and Fe: K $\beta$ <sub>1</sub> at 51.73° and K $\alpha$ <sub>1</sub> at 57.47°.

The compound is air stable when dry, but in solution in the absence of carbon monoxide it decomposes rapidly. It is insoluble in pentane and water, sparingly soluble in hexane and carbon tetrachloride, and soluble in dichloromethane and acetone.

The infrared spectrum showed the absence of bridging as well as ketonic carbonyl. The spectrum in the C–O stretching region of I in dichloromethane showed the following bands (cm.<sup>-1</sup>): 1883.3 (w), 1916.6 (sh, w), 1950 (m), 1988.8 (s), 2011 (m), and 2016.7 (sh, w).

The new compound probably has the two Mo and the two Fe atoms tetrahedrally coordinated to the Sn(IV). An X-ray study of the compound is being made by Dr. E. Corey.

We have also isolated a dark red (almost black) residue from the reaction of III and sodium tetracarbonylcobaltate(-I), NaCo(CO)<sub>4</sub>. The X-ray emission spectrum showed bands corresponding to Sn, Co, and Fe. The compound was difficult to purify and has not been isolated in pure form as yet.

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(4) Microanalyses were performed by Galbraith Laboratories, Knoxville, Tenn.

(5) Determined in benzene using a Mechrolab vapor pressure osmometer.

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