

CHAPTER – V

5. Reactions of 3-carboxy-2-hydroxybenzaldehyde morpholine N-thiohydrazone ($H_2chbmth$) with R_2MCl_2 (where, $R = \pi-C_5H_5$, and $M = Ti/Zr$; $R = Me/Ph$, $M = Sn$; $R = OMe$ and $M = Ti$), $(\pi-C_5H_5)Ti(OMe)Cl_2$ and $RMCl_3$ ($R = Me/Ph$ and $M = Sn$; $R = \pi-C_5H_5$ and $M = Ti$) leading to the synthesis of new organo-derivatives of titanium(IV), zirconium(IV) and tin(IV).

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5.1 Introduction

It is demonstrated earlier [1] that hydrazone ligands have enzyme inhibiting properties. The tuberculostic properties of hydrazides and their derivatives have also been extensively studied [2] and the coordination products of hydrazides with different carbonyl compounds (aldehydes / ketones) are known to be less toxic than the parent hydrazides; and this is probably due to the blocking of the free amino group. Because of this and as a part of our systematic studies of hydrazides and hydrazone ligands [3-7], we have very recently synthesized 3-carboxy-2-hydroxybenzaldehyde morpholine N-thiohydrazone ($H_2chbmth$) by the condensation of 3-formylsalicylic acid with morpholine N-thiohydrazide and studied its reactions with first and second row transition metal salts under varied reaction conditions and isolated many new metal complexes of the ligand $H_3chbmthol$ which is the thiol form of the hydrazone $H_2chbmth$ (Fig. 5.1) [8]. In most of the cases $H_3chbmthol$ functions as a dibasic tridentate NSO donor ligand, the COOH group being remained free. In continuation of this work we further studied the reactions of $H_2chbmth$ with $(\pi-C_5H_5)_2TiCl_2$, $(\pi-C_5H_5)_2ZrCl_2$, Me_2SnCl_2 , Ph_2SnCl_2 , $(\pi-C_5H_5)_2Ti(OMe)Cl_2$, $(OMe)_2TiCl_2$, $(\pi-C_5H_5)TiCl_3$, $MeSnCl_3$ and $PhSnCl_3$ and isolated many new organoderivatives of Ti(IV), Zr(IV) and Sn(IV). This chapter records the

results of these investigations and also describes the reactions of $[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})\text{Cl}]$ and $[\text{MeSn}(\text{Hchbmthol})\text{Cl}]$, isolated in this study, with MeSH , $\text{Me}_3\text{SiNMe}_2$ and $\text{Me}_3\text{SiC}\equiv\text{C-Ph}$.

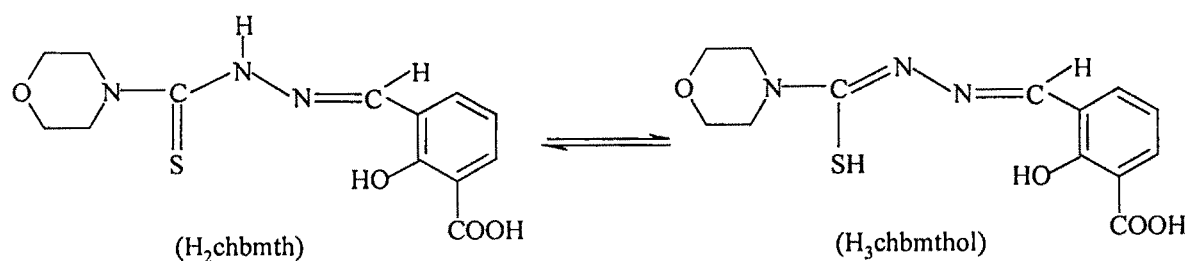


Fig 5.1 Tautomerism between the thioketo (H_2chbmth) and thiol ($\text{H}_3\text{chbmthol}$) form of the ligand.

5.2 Experimental

Preparation of the Complexes

Organotitanium(IV), organozirconium(IV) and organotin(IV) complexes:

To the thiohydrazone ligand H_2chbmth (0.773 g, 2.5 mmol) in methanol-nitromethane mixture (40 mL, 50:50, v/v) was added $(\pi\text{-C}_5\text{H}_5)_2\text{TiCl}_2$ (0.622 g, 2.5 mmol) or $(\pi\text{-C}_5\text{H}_5)_2\text{ZrCl}_2$ (0.73 g, 2.5 mmol) in dry toluene (40 mL) in the presence of stoichiometric amount of Et_3N and stirred for 8 h at $\sim 50^\circ\text{C}$ and the solvent removed under reduced pressure. *n*-Hexane (20 mL) was then added to this crude product and cooled to -10°C affording reddish-brown $[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})\text{Cl}]$ (**1**) and brown $[(\pi\text{-C}_5\text{H}_5)\text{Zr}(\text{Hchbmthol})\text{Cl}]$ (**2**) respectively. These were filtered, washed with *n*-hexane and dried in *vacuo*, yield 75 % (for **1**) and 70 % (for **2**).

Similarly, the reactions of H_2chbmth (0.773 g, 2.5 mmol) with Me_2SnCl_2 (0.55 g, 2.5 mmol) or Ph_2SnCl_2 (0.86 g, 2.5 mmol) or $(\text{OMe})_2\text{TiCl}_2$ (0.45 g, 2.5 mmol) or $(\pi\text{-C}_5\text{H}_5)\text{TiCl}_3$ (0.55 g, 2.5 mmol) or MeSnCl_3 (0.60 g, 2.5 mmol) or PhSnCl_3 (0.755 g, 2.5 mmol) yielded reddish-brown $[\text{MeSn}(\text{Hchbmthol})\text{Cl}]$ (**3**), reddish-brown $[\text{PhSn}(\text{Hchbmthol})\text{Cl}]$ (**4**), yellowish-brown $[\text{MeOSn}(\text{Hchbmthol})\text{Cl}]$ (**5**), yellowish-orange $[\text{MeSn}(\text{Hchbmthol})\text{Cl}]$ (**6**), reddish-purple $[\text{PhSn}(\text{Hchbmthol})\text{Cl}]$ (**7**) and brown

$[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})\text{Cl}]$ (**8**) respectively. The compounds (**1**) and (**8**) are identical, though isolated from two different reactions. Yields of the compounds vary between 65-75 %

Analogous reaction of H_2chbmth (0.773 g, 2.5 mmol) in dry chloroform-ethanol mixture (40 mL, 50:50, v/v) with hot solution of $(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{MeO})\text{Cl}_2$ (0.374 g, 2.5 mmol) in dry chloroform (70 mL) afforded $[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})(\text{MeO})]$ (**9**). Similarly compounds (**3**) and (**4**) are identical with compounds (**6**) and (**7**) respectively, though isolated from two different reactions. Yields of the compounds vary between 65-75 %.

Reactions of $[\text{MeSn}(\text{Hchbmthol})\text{Cl}]$ (6**) and $[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})\text{Cl}]$ (**8**)**

Reactions with MeSH

One equivalent of $[\text{MeSn}(\text{Hchbmthol})\text{Cl}]$ (**6**) (0.476 g, 1 mmol) was added to an equivalent of MeSH (0.048, 1 mmol) in thf-toluene (50:50, v/v) (50 mL) and stirred at room temperature in the presence of a stoichiometric amount of Et_3N (0.1 g, 1 mmol) for 4 days. Solid $\text{Et}_3\text{N}\cdot\text{HCl}$ was separated and removed by filtration and the volume of the solution was reduced under vacuum. The solution was cooled to $-10\text{ }^\circ\text{C}$ to give the solid compound $[\text{MeSn}(\text{Hchbmthol})\text{SMe}]$ (**10**), which was washed with *n*-hexane and dried in *vacuo*. Yield 70 %.

Reaction with $\text{Me}_3\text{Si}(\text{NMe}_2)$

The complex $[\text{MeSn}(\text{Hchbmthol})\text{Cl}]$ (**6**) (0.476 g, 1 mmol) was treated with an equimolar quantity of $\text{Me}_3\text{Si}(\text{NMe}_2)$ (0.117 g, 1 mmol) as before in the same solvent system (60 mL) and a brown compound $[\text{MeSn}(\text{Hchbmthol})\text{NMe}_2]$ (**11**) was isolated. Yield 75 %.

Reaction with $\text{Me}_3\text{SiC}\equiv\text{CPh}$

Similarly, the compound (**6**) (0.476 g, 0.001 mol) when treated with $\text{Me}_3\text{SiC}\equiv\text{CPh}$ (0.174 g, 0.001 mol) (1:1 equivalent) in thf, yielded brown compound $[\text{MeSn}(\text{Hchbmthol})(\text{C}\equiv\text{CPh})]$ (**12**). Yield 60 %.

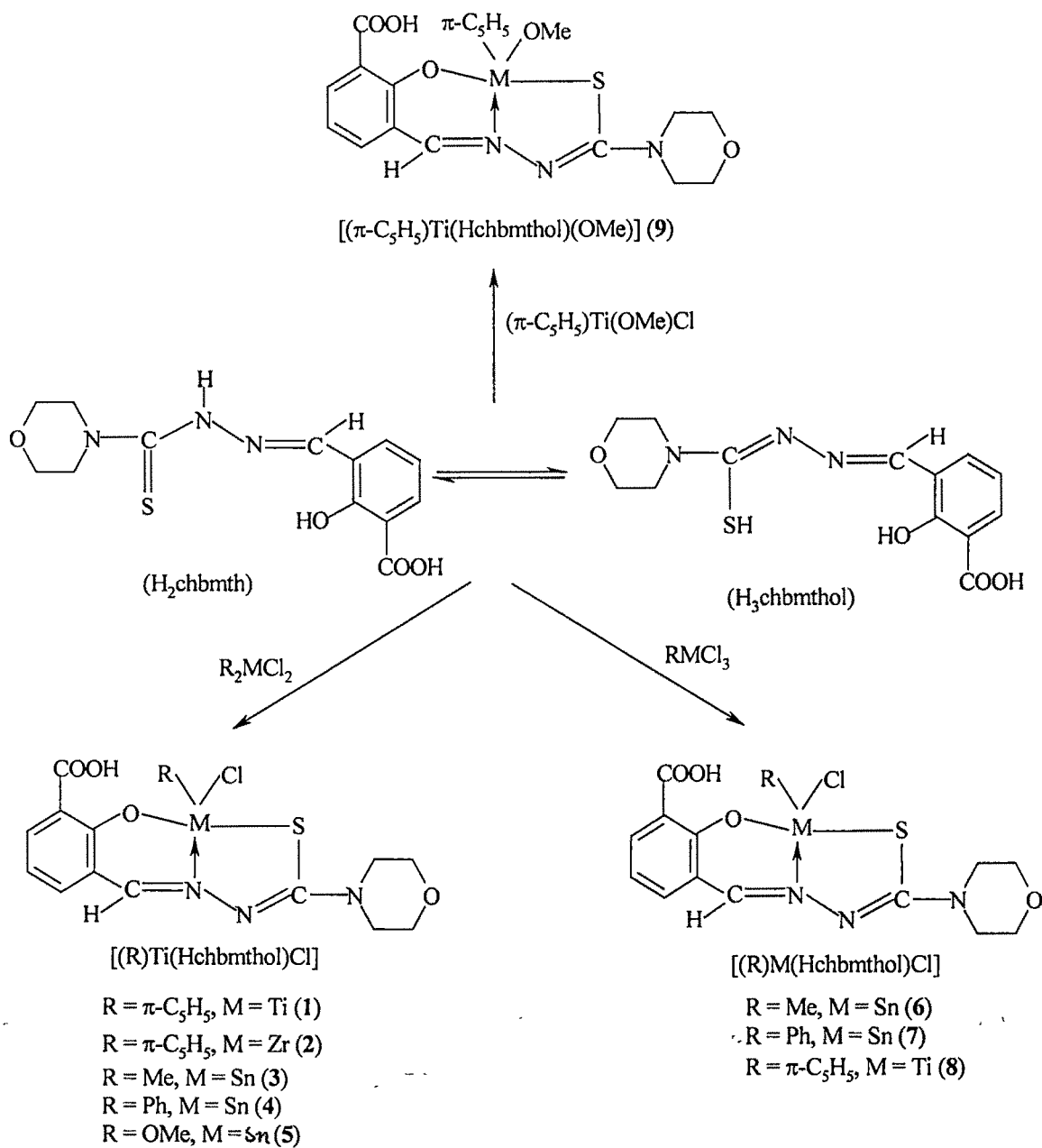
Similarly, the reactions of $[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})\text{Cl}]$ (**8**) with MeSH, $\text{Me}_3\text{Si}(\text{NMe}_2)$ and $\text{Me}_3\text{SiC}\equiv\text{CPh}$ under same reaction conditions yielded red $[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})\text{SMe}]$ (**13**), light-brown $[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})(\text{NMe}_2)]$ (**14**) and light-brown $[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})(\text{C}\equiv\text{CPh})]$ (**15**) respectively. Yields of the compounds vary between 70-75 %.

5.3 Results and Discussion

Syntheses

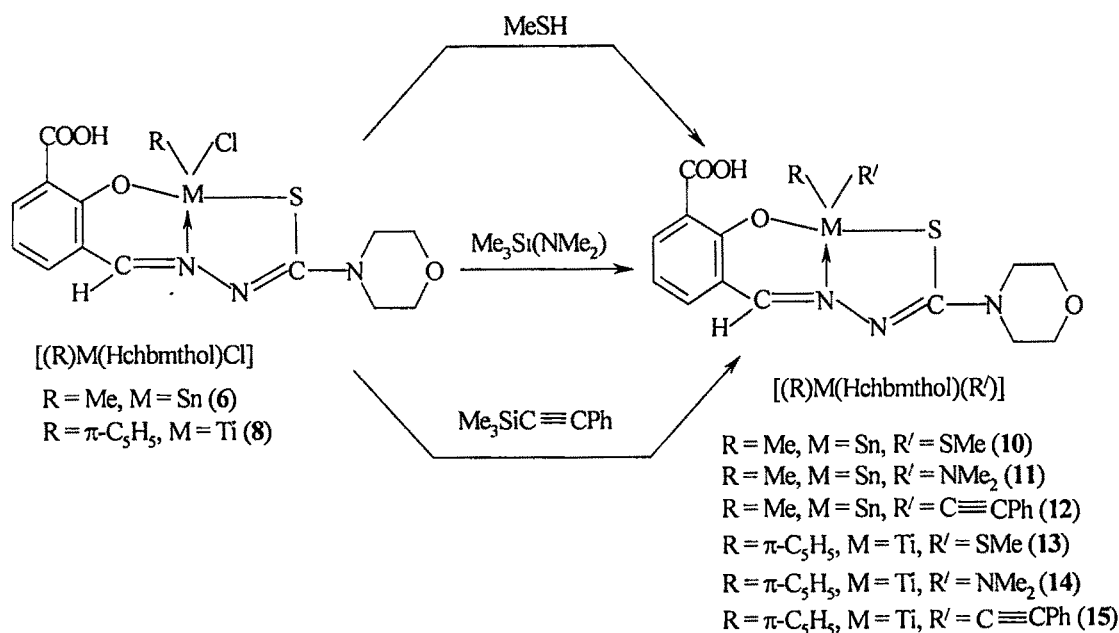
The reaction of 3-formylsalicylic acid with morpholine N-thiohydrazide in 1:1 molar ratio in dehydrated ethanol afforded 3-carboxy-2-hydroxybenzaldehyde morpholine N-thiohydrazone (abbreviated to H_2chbmth) (Fig. 5.1), the formation of which is supported by the analytical and spectral data (see latter discussion).

The thiohydrazone H_2chbmth has a proton adjacent to the thione group. It is known that the thione group is relatively unstable in the monomeric form and tends to the more stable C–S bond by enethiolization if there is at least one proton adjacent to thione group [15]. Therefore, the thione form H_2chbmth and the thiol form $\text{H}_3\text{chbmthol}$ may remain in equilibrium in solution (Fig. 5.1). It was observed by us earlier [8] that the reactions of H_2chbmth with different metal salts under varied reaction conditions yielded complexes of the corresponding thiol form of the ligand where it functions as dibasic tridentate fashion bonding through O, N and S atoms with different metal ions. Neutral and bidentate behaviour was also encountered in certain cases bonding through thione S and azomethine N [8]. However, in the present study ligand uniformly acts as dibasic tridentate fashion bonding through thiol S (after deprotonation), azomethine $\widehat{\text{N}}$ and phenolic O (after deprotonation) and the carboxylic acid group always found to be remained free (Schemes 5.1 and 5.2).



N B. The compound (1) & (8), (3) & (6) and (4) & (7) are identical though isolated from different reactions/starting materials

Scheme 5.1

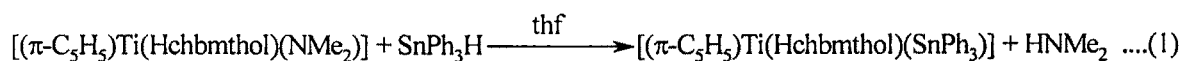


Scheme 5.2 Reactions of $[(Me)Sn(Hchbmthol)Cl]$ (**6**) and $[(\pi-C_5H_5)Ti(Hchbmthol)Cl]$ (**8**) with MeSH, Me_3SiNMe_2 and $Me_3SiC \equiv CPh$

All the isolated complexes are stable at laboratory conditions and have been characterized by elemental analyses, molecular weights, molar conductances, magnetic moments and spectroscopic (UV-Vis., IR and 1H NMR) data. Some characterization data are collected in Table 5.1.

The reactivity of the Sn-Cl bond in the complex $[MeSn(Hchbmthol)Cl]$ (**6**) with different substrates was studied leading to the syntheses of many new organotin(IV) derivatives. Thus the complex (**6**) on reaction with MeSH in thf-toluene (Et_3N) gave $[MeSn(Hchbmthol)SMe]$ (**10**). Similarly, it reacted smoothly with $Me_3Si(NMe_2)$ and $Me_3SiC \equiv CPh$ in a mixed solvent system and afforded amino- and phenylethynyl complexes of organotin(IV) (Scheme 5.2) *via* desilylation of the reagents, which is the driving force of the above reactions. Since the by-product Me_3SiCl is a low boiling liquid and miscible with common organic solvents, it is easily removed by low-pressure distillation. Hence, the new organotin(IV) compounds of the type $[MeSn(Hchbmthol)L]$ were obtained in very pure form and good yield (where, $L = NMe_2$ (**11**); $C \equiv CPh$ (**12**)). Similarly, the reactions of Ti-Cl bond in the complex $[(\pi-C_5H_5)Ti(Hchbmthol)Cl]$ (**8**) was

studied and new organotitanium(IV) derivatives, $[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})\text{L}']$ isolated in the pure form and in good yield (Scheme 5.2) (where, $\text{L}' = \text{SMe}$ (**13**); NMe_2 (**14**); $\text{C}\equiv\text{CPh}$ (**15**)). Treatment of $[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})(\text{NMe}_2)]$ (**14**) with SnPh_3H in thf gave a solution from which a brown solid compound $[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})(\text{SnPh}_3)]$ (**16**) could be isolated (equation 1):



The complex (**16**) is unstable in air and decomposes on heating at 250-254 °C.

The elemental analyses of the isolated complexes agree well with their formulations (Table 5.1). The molecular weights (measured by cryoscopic and Rast's method) are also in good agreement with the theoretical values. The complexes are soluble in coordinating solvents like DMSO, DMF, Py and also in other solvents like chloroform and methanol. All the complexes are insoluble in *n*-hexane and ether.

Molar Conductance

The molar conductance values of the complexes in DMSO solutions show very low values, in the range 3.8 to 19.2 $\text{cm}^2\text{ohm}^{-1}\text{mol}^{-1}$ (Table 5.1), indicating their non-electrolytic [16] nature.

Electronic Spectra

The ligand H_2chbmth showed two very intense bands around 260 and 370 nm in solution of DMSO and these are due to the intra-ligand charge transfer transitions $\pi \rightarrow \pi^*$ and $n \rightarrow \pi^*$, respectively. These bands are very slightly red-shifted along with other bands in the complexes. The titanium and zirconium complexes showed another band around 440–445 nm assignable to charge-transfer [17,18] in accordance with the $(n-1)d^0ns^0$ electronic configuration of Ti(IV) and Zr(IV). The data available for (**1**), (**2**), (**8**), (**9**), (**13**) to (**15**) suggest the coordination number five for these complexes [19-21]. The complexes are all diamagnetic.

Table 5.1 Some characterization data of the complexes

Compound	Mol. Wt		M.p. ^a (°C)	Colour	Yield (%)	Analyses				Λ_M^b $\Omega^{-1} \text{cm}^2 \text{mol}^{-1}$
	Found (Calcd.)	Found (Calcd.)				C	H	N	Cl	
H ₃ chbmthol (H ₄ L)	321	185-187	Yellow	83	50.41	4.83	13.50	—	—	—
C ₁₃ H ₁₅ O ₄ N ₃ S	(309.24)				(50.48)	(4.89)	(13.58)			
[(π -C ₅ H ₅)Ti(HL)Cl] (1)	462	201-205	Reddish	75	47.49	3.93	9.16	7.75	10.57	10.2
C ₂₀ H ₁₈ O ₄ N ₃ SClTi	(455.75)		- brown		(47.44)	(3.98)	(9.22)	(7.78)	(10.50)	
[(π -C ₅ H ₅)Zr(HL)Cl] (2)	510	250-255	Brown	70	43.29	3.60	8.37	7.17	18.23	9.9
C ₂₀ H ₁₈ O ₄ N ₃ SClZr	(499.10)				(43.32)	(3.63)	(8.42)	(7.10)	(18.28)	
[MeSn(HL)Cl] (3)	483	248-250	Orange-	70	35.32	3.42	8.86	7.49	24.94	21.88
C ₁₄ H ₁₆ O ₄ N ₃ SClSn	(476.52)		red		(35.29)	(3.38)	(8.82)	(7.44)	(24.910)	
[PhSn(HL)Cl] (4)	550	240-244	Reddish	70	42.41	3.43	7.84	6.63	22.11	18.80
C ₁₉ H ₁₈ O ₄ N ₃ SClSn	(538.59)		-purple		(42.37)	(3.37)	(7.80)	(6.58)	(22.040)	
[OMeSn(HL)Cl] (5)	509	232-236	Yellow	75	34.26	3.26	8.63	—	24.18	14.76
C ₁₄ H ₁₅ O ₅ N ₃ SClSn	(491.51)				(34.21)	(3.08)	(8.55)		(24.19)	

(continued)

Table 5.1 (contd.)

Compound	Mol. Wt		M.p. ^a (°C)	Colour	Yield (%)	Analyses			Λ _M ^b Ω ⁻¹ cm ² mol ⁻¹	
	Found (Calc.)	M.p. ^a (°C)				Found (Calc.)	Found (Calc.)	%		
[(π-C ₅ H ₅)Ti(HL)OMe] (9)	443 (451.33)	210-213	Brown	65	50.61 (50.56)	4.65 (4.69)	9.27 (9.31)	—	10.57 (10.61)	16.87
[MeSn(HL)(SMe)] (10)	493 (488.16)	260-264	Reddish -brown	70	36.89 (36.96)	3.85 (3.92)	8.55 (8.61)	—	24.27 (24.32)	13.09
[MeSn(HL)(NMe ₂)] (11)	499 (485.15)	230-232	Brown	70	39.55 (39.61)	4.51 (4.57)	11.48 (11.55)	—	24.51 (24.47)	14.18
[MeSn(HL)(C≡CPh)] (12)	556 (542.20)	200-203	Brown	70	48.80 (48.73)	3.96 (3.90)	7.71 (7.75)	—	21.94 (21.89)	14.18
[(π-C ₅ H ₅)Ti(HL)(SMe)] (13)	481 (467.39)	240-244	Red	70	48.76 (48.83)	4.50 (4.53)	8.91 (8.99)	—	10.20 (10.24)	16.97
[(π-C ₅ H ₅)Ti(HL)(NMe ₂)] (14)	480 (464.38)	220-225	Light- brown	65	51.67 (51.73)	5.17 (5.21)	12.12 (12.06)	—	10.26 (10.31)	15.83
[(π-C ₅ H ₅)Ti(HL)(C≡CPh)] (15)	534 (521.43)	190-194	Light- brown	70	59.95 (59.89)	4.53 (4.45)	8.13 (8.06)	—	9.23 (9.18)	14.07

^aDecomposition temperature; ^b10⁻³ M solution in DMSO at room temperature

N.B. The compound (1) & (8), (3) & (6) and (4) & (7) are identical, though isolated from different reactions / starting materials

Infrared and ¹H NMR Spectra

The infrared spectra of the ligand and the metal complexes have been measured in KBr phase. The thiohydrazone, H₂chbmth shows no band in the region *ca.* 2570 cm⁻¹ assignable to ν(SH) [22], instead a band at 770 cm⁻¹ assignable to ν(C=S) is observed suggesting that in the solid state the ligand remains in thioketo form (Fig 5.1). However, in solution, both the thioketo (H₂chbmth) and thiolo (H₃chbmthol) tautomeric forms may remain in equilibrium [23,24] (Fig 5.1).

The uncomplexed ligand shows bands assignable to ν(NH) in the region 3200-2900 cm⁻¹. But the ν(OH) band at 3500 cm⁻¹ is not observed and this may be due to strong hydrogen bonding, which probably shifts ν(OH) to lower frequency. The bands due to ν(OH/NH) are disappeared in all the complexes indicating conversion of thione to thiolo form and coordination of phenolic oxygen atom after deprotonation. The disappearance of ν(NH) and concomitant appearance of a new band at 1600 cm⁻¹ due to azine chromophore >C=N-N=C< support the conversion of H₂chbmth to H₃chbmthol and formation of complexes by bonding through ONS donor sites (see latter discussion). However, presence of free -COOH group makes the interpretation difficult. The C=N stretching vibration of the free ligand occur [25,26] at 1630 cm⁻¹ but on complexation this band, in all the cases, is shifted towards the lower frequency region suggesting that the ligand is coordinated to the metal *via* the azomethine nitrogen atom [27]. This lowering of C=N bond order as a result of the M-N bond formation [28] as evident from the appearance of a new ν(M-N) bands in the far infrared region.

The free ligand possesses potential thioamide groups and therefore displays characteristic thioamide bands I to IV in the region 1560-770 cm⁻¹. The thioamide bands of the free ligand are located at 1560, 1440, 1305 and 770 cm⁻¹ and these are affected appreciably in the metal complexes [29-31]. The thioamide band IV, mainly due to ν(C=S) is disappeared in the metal complexes indicating coordination of sulphur atom after deprotonation from thiol form, H₃chbmthol (see above discussion) [32-34], which gets further support by the appearance of new M-S bands in the far infrared region.

It is evident that in the present complexes both the phenolic OH and thioamide band IV disappeared, instead a new band due to ν(C-S) around 720-700 cm⁻¹ is observed

suggesting the coordination of metal ion through thio-sulphur and phenolic oxygen *via* deprotonation. Moreover, the new $\nu(\text{C}=\text{N})$ stretching mode is also lowered by about 25 cm^{-1} . It may, therefore, be inferred that in the present complexes (1) to (15) the ligand functions in dibasic tridentate way bonding through O, N and S atoms. However, the presence of free carboxylic acid group makes the interpretation difficult. All the complexes show broad medium bands in the region $3600\text{--}2990\text{ cm}^{-1}$ which are assignable to free carboxyl group [35,36].

The bands at $1210\text{--}1200\text{ cm}^{-1}$ [$\nu(\text{CO})$], $1250\text{--}1240\text{ cm}^{-1}$ [$\nu(\text{CN})$], 1105 and $920\text{--}895\text{ cm}^{-1}$ (out of plane and in plane deformation) of the morpholine ring moiety are not affected appreciably in the metal complexes, indicating that the morpholine ring oxygen and nitrogen are not involved in coordination [36,37].

In the organotitanium(IV) and organozirconium(IV) complexes (1), (2), (8), (9), (13), (14) and (15) show additional bands in the regions $590\text{--}610$ and $520\text{--}530\text{ cm}^{-1}$ assignable to $\nu(\text{Ti-O})$, $\nu(\text{Zr-O})$, $\nu(\text{Ti-N})$ and $\nu(\text{Zr-N})$ respectively. The $\nu(\text{Ti-Cl})$ and $\nu(\text{Zr-Cl})$ observed in the range $340\text{--}350\text{ cm}^{-1}$ in the compounds (1), (2) and (8). In the organotin(IV) complexes (3) to (7) and (10) to (12) new bands at around 540 , 430 and 340 cm^{-1} may be attributed to $\nu(\text{Sn-O})$, $\nu(\text{Sn-N})$ and $\nu(\text{Sn-Cl})$ respectively [38,39]. The $\nu(\text{M-S})$ ($\text{M} = \text{Ti, Zr or Sn}$) in all the complexes appeared in the range $355\text{--}370\text{ cm}^{-1}$ [38,39].

The ^1H NMR data (in $\text{DMSO-}d_6$) showed the absence of $\delta(\text{CHO})$ at 9.25 ppm in the ligand H_2chbmth which was found in 3-formylsalicylic acid. No azomethine proton signal $\delta(\text{CH}=\text{N})$ could be detected either. The signals for $\delta(\text{OH})$ and $\delta(\text{NH})$ disappeared after the addition of D_2O . The broad signal at $\delta 6.5\text{ ppm}$ to $\delta 7.9\text{ ppm}$ may be assigned to the phenyl resonance region. The resonance peak for the COOH protons could be detected around $\delta 12.06\text{ ppm}$ (broad signal) [40]. The integral ratio of the three protons on the morpholine ring, phenyl group, carboxyl group, and also the proton(s) on carbon and nitrogen is quite consistent with the formulations of the complexes. As expected, there is no remarkable change in the chemical shifts of morpholine ring proton signals, which appeared at $\delta 3.4\text{--}3.6\text{ ppm}$. However, the NH proton ($\delta 11.25\text{ ppm}$) signals completely disappeared in all the complexes suggesting dibasic tridentate NSO donor nature of the ligand (see IR discussion above). In addition, signals for $\pi\text{-C}_5\text{H}_5$, CH_3S ,

NMe₂, MeSn appeared at δ 6.5 (slightly broadened singlet), 3.44 (s), 3.52 (slightly broadened singlet) and 0.91 (s) ppm respectively supporting the formulations of the complexes [39] (Schemes 5.1 & 5.2).

5.4 Abstract

The reaction of 3-formylsalicylic acid with morpholine N-thiohydrazide produces 3-carboxy-2-hydroxybenzaldehyde morpholine N-thiohydrazone (H₂chbmth) which remains in equilibrium in solution with its corresponding thiol form H₃chbmthol having NSO donor set of atoms. The reactions of the thiohydrazone ligand with different organometallic compounds viz R₂MCl₂ (R = π -C₅H₅ & M = Ti / Zr; R = Me / Ph & M = Sn; R = OMe & M = Sn), (π -C₅H₅)₂Ti(Ome)Cl₂ and RMCl₃ (R = Me / Ph & M = Sn; R = π -C₅H₅ & M = Ti) leading to the syntheses of many new organometallic derivatives have been studied. In all of the complexes the dianion of the H₃chbmthol ligand functions as a dibasic tridentate NSO donor fashion. The reactions of [(π -C₅H₅)Ti(Hchbmthol)Cl] and [MeSn(Hchbmthol)Cl], isolated in this study, with Me₃SiE (where, E stands for SMe, NMe₂ and C \equiv CPh) have also been studied and isolated many new organoderivatives of these two metal ions. All the compounds under study have been characterized by the elemental analyses, magnetic susceptibilities, molar conductance values, molecular weights and spectroscopic (UV-Vis., IR, ¹H NMR) data. Based upon these data the geometry of the compounds has also been proposed.

5.5 References

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