CHAPTER V

STUDIES ON HYDRAZONE COMPLEXES OF ZINC(II) AND CADMIUM(II)
INTRODUCTION

Hydrazones exhibit different behaviours in the metal complexes.\textsuperscript{1-8} One can predict the following four types of formulation in salicylidene salicylhydrazone and salicylidene benzoylhydrazone depending on the involvement of the coordination sites viz. C=N and C=O and active group $\text{-OH}$ on the aldehyde residue.

\begin{align*}
\text{I} & \quad X = \text{H or OH} \\
\text{II} & \quad X = \text{H or OH}
\end{align*}
The structures I, II & III depict different modes of attachment of the ligand to the metal ion in the keto form: I, monovalent tridentate, II, monovalent bidentate, and III, neutral bidentate. In the enol form such type of ligands probably show bivalent tridentate behaviour (IV). It is possible to know the mode of bond formation and the form of the ligand in the complexes with the help of spectroscopic data.

Though much work is done on the transition metal complexes\textsuperscript{1} with hydrazones, considerably little is known about Zn(II) and Cd(II) hydrazone complexes.\textsuperscript{9-11} In this Chapter, synthesis and spectral results of a few Zn(II)
and Cd(II) complexes with the following hydrazones are reported.

\[
R = H \\
\text{II } R = \text{CH}_3 \\
\text{III } R = \text{Cl}
\]

\[
R = H \\
\text{IV}
\]

\[
R = H \\
\text{V } R = \text{H} \\
\text{VI } R = \text{CH}_3 \\
\text{VII } R = \text{Cl}
\]

\[
\text{VIII}
\]
EXPERIMENTAL

Preparation of Hydrazones

The detailed procedures for the preparation of the hydrazones are given in Chapter II.

Preparation of the Complexes of Zn(II)

An ethanolic solution (0.2M) of benzoylhydrazide and aldehyde was added to an aqueous zinc acetate solution (0.1M). The reaction mixture was heated for a while on water bath and the complex precipitated was filtered and washed free from the ligand with ethanol and finally with ether and dried in vacuum over $P_2O_5$.

In the case of $o$-hydroxy-benzoylhydrazide, 0.1M of the hydrazide and 0.1M of the corresponding aldehydes were used for the preparation of complexes.

Preparation of the Complexes of Cd(II)

The same procedure outlined above was used to prepare the complexes. Here an aqueous cadmium acetate solution (0.1M) and an ethanolic solution (0.2M) of hydrazide and aldehyde were used.
Elemental Analysis

The zinc in the complexes was estimated volumetrically using EDTA and the cadmium gravimetrically as cadmium pyrophosphate. The nitrogen was estimated by the Dumas method. Carbon and hydrogen were determined by microanalytical methods. The detailed procedures for the elemental analysis are given in Chapter II. The results of the elemental analysis are shown in Tables 1 and 3.

Physical Measurements

The conductivity measurements are done on an ELICO CM-82 conductivity bridge with a cell having a cell constant of 0.829 cm\(^{-1}\). The I.R. spectra of the complexes in nujol mull were recorded on Beckmann IR-20 in the region of 4000-650 cm\(^{-1}\) and on Carl-Zeiss UR-10 in the region of 4000-400 cm\(^{-1}\).

RESULTS AND DISCUSSION

Complexes of Zn(II)

The complexes are yellow in colour, insoluble in common organic solvents. However they are soluble to some extent in DMF, DMSO and pyridine. This insolubility in the
### TABLE 1
Elemental analysis of Zn(II) complexes with aroyl hydrazones

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Ligand No.</th>
<th>Complex No.</th>
<th>Empirical formula</th>
<th>% Zn Found</th>
<th>% Zn Calcd</th>
<th>% N Found</th>
<th>% N Calcd</th>
<th>% C Found</th>
<th>% C Calcd</th>
<th>% H Found</th>
<th>% H Calcd</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I</td>
<td>IX</td>
<td>Zn(C₁₄H₁₁N₂O₂₂)₂</td>
<td>11.74</td>
<td>12.03</td>
<td>9.85</td>
<td>10.30</td>
<td>61.38</td>
<td>61.84</td>
<td>3.46</td>
<td>4.05</td>
</tr>
<tr>
<td>2</td>
<td>II</td>
<td>X</td>
<td>Zn(C₁₅H₁₃N₂O₂₂)₂</td>
<td>11.57</td>
<td>11.44</td>
<td>9.79</td>
<td>9.80</td>
<td>62.63</td>
<td>63.01</td>
<td>4.33</td>
<td>4.55</td>
</tr>
<tr>
<td>3</td>
<td>III</td>
<td>XI</td>
<td>Zn(C₁₄H₁₀N₂O₂Cl₂)</td>
<td>10.33</td>
<td>10.68</td>
<td>8.67</td>
<td>9.15</td>
<td>55.04</td>
<td>54.87</td>
<td>3.15</td>
<td>3.27</td>
</tr>
<tr>
<td>4</td>
<td>IV</td>
<td>XII</td>
<td>Zn(C₁₈H₁₃N₂O₂₂)₂</td>
<td>9.92</td>
<td>10.16</td>
<td>8.39</td>
<td>8.71</td>
<td>66.71</td>
<td>67.15</td>
<td>4.59</td>
<td>4.04</td>
</tr>
<tr>
<td>5</td>
<td>V</td>
<td>XIII</td>
<td>Zn(C₁₄H₁₀N₂O₃)</td>
<td>20.36</td>
<td>20.46</td>
<td>8.90</td>
<td>8.77</td>
<td>51.53</td>
<td>52.59</td>
<td>3.65</td>
<td>3.13</td>
</tr>
<tr>
<td>6</td>
<td>VI</td>
<td>XIV</td>
<td>Zn(C₁₅H₁₂N₂O₃)</td>
<td>19.45</td>
<td>19.61</td>
<td>8.78</td>
<td>8.40</td>
<td>52.62</td>
<td>50.40</td>
<td>3.76</td>
<td>3.60</td>
</tr>
<tr>
<td>7</td>
<td>VII</td>
<td>XV</td>
<td>Zn(C₁₄H₉N₂O₃Cl)</td>
<td>18.31</td>
<td>18.48</td>
<td>8.01</td>
<td>7.91</td>
<td>47.40</td>
<td>47.47</td>
<td>2.78</td>
<td>2.54</td>
</tr>
<tr>
<td>8</td>
<td>VIII</td>
<td>XVI</td>
<td>Zn(C₁₈H₁₂N₂O₅)</td>
<td>17.60</td>
<td>17.70</td>
<td>7.10</td>
<td>7.58</td>
<td>59.12</td>
<td>58.48</td>
<td>3.44</td>
<td>3.25</td>
</tr>
<tr>
<td>S.No.</td>
<td>Ligand No.</td>
<td>Complex No.</td>
<td>Empirical formula</td>
<td>% Cd Found</td>
<td>% Cd Calcd.</td>
<td>% N Found</td>
<td>% N Calcd.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>------------</td>
<td>-------------</td>
<td>------------</td>
<td>------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I</td>
<td>XVII</td>
<td>Cd(C_{14}H_{11}N_{2}O_{2})_2</td>
<td>19.77</td>
<td>19.03</td>
<td>10.11</td>
<td>9.48</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>II</td>
<td>XVIII</td>
<td>Cd(C_{15}H_{13}N_{2}O_{2})_2</td>
<td>17.50</td>
<td>18.18</td>
<td>9.10</td>
<td>9.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>III</td>
<td>XIX</td>
<td>Cd(C_{14}H_{10}N_{2}O_{2}Cl)_2</td>
<td>16.79</td>
<td>17.04</td>
<td>8.95</td>
<td>8.49</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>IV</td>
<td>XX</td>
<td>Cd(C_{16}H_{13}N_{2}O_{2})_2</td>
<td>16.05</td>
<td>16.29</td>
<td>8.54</td>
<td>8.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>V</td>
<td>XXI</td>
<td>Cd(C_{14}H_{11}N_{2}O_{3})_2</td>
<td>17.45</td>
<td>18.05</td>
<td>9.11</td>
<td>9.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>VI</td>
<td>XXII</td>
<td>Cd(C_{15}H_{13}N_{2}O_{3})_2</td>
<td>17.66</td>
<td>17.28</td>
<td>8.92</td>
<td>8.61</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>VII</td>
<td>XXIII</td>
<td>Cd(C_{14}H_{10}N_{2}O_{3}Cl)_2</td>
<td>16.80</td>
<td>16.26</td>
<td>7.89</td>
<td>8.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>VIII</td>
<td>XXIV</td>
<td>Cd(C_{18}H_{13}N_{2}O_{3})_2</td>
<td>16.10</td>
<td>15.56</td>
<td>7.35</td>
<td>7.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 3
Elemental analysis of Cd(II) complexes with aroyl hydrazones
common organic solvents has precluded the determination of molecular weights of the complexes. The analytical results shown in Table 1 agree with the formula containing two molecules of ligand per atom of zinc in the complexes IX to XII and one molecule of ligand in the complexes XIII-XVI.

Conductance

The molar conductance values of the complexes in DMSO at the concentration \( \sim 10^{-3} \text{M} \) are too low to measure for any dissociation of the complexes in the solvent. Hence the complexes are non-electrolytes.

Infrared Spectra

The important infrared bands of the ligands and the complexes are listed in Table 2 along with their assignments. The typical infrared spectra of the complexes are shown in Figs. 1 and 2.

The broad band of medium intensity around 3200 cm\(^{-1}\) and broad weak band in the region 2800-2700 cm\(^{-1}\) observed for the ligands I-VIII are respectively assigned to the \( \gamma(\text{NH})^{12} \) and intramolecularly H- bonded OH vibrations. Similar types of broad weak band due to H bonded
TABLE 2

Important infrared frequencies (in cm⁻¹) of Zn(II) complexes with aroyl hydrazones and their assignments

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Ligand No.</th>
<th>Complex No.</th>
<th>( \nu (\text{NH}) )</th>
<th>( \nu (\text{C=O}) )</th>
<th>( \nu (\text{C=N}) )</th>
<th>( \nu (\text{C=O}) )</th>
<th>( \nu (\text{C-O}) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I</td>
<td>IX</td>
<td>3140</td>
<td>1625</td>
<td>1585</td>
<td>1585</td>
<td>1325</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1547</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1505</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>II</td>
<td>X</td>
<td>3140</td>
<td>1640</td>
<td>1615</td>
<td>1585</td>
<td>1320</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1545</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1503</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>III</td>
<td>XI</td>
<td>3140</td>
<td>1620</td>
<td>1580</td>
<td>1580</td>
<td>1322</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1555</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1498</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>IV</td>
<td>XII</td>
<td>3140</td>
<td>1620</td>
<td>1580</td>
<td>1580</td>
<td>1310</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1550</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1500</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>V</td>
<td>XIII</td>
<td>-</td>
<td>-</td>
<td>1630</td>
<td>1590</td>
<td>1335</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1610</td>
<td>1560</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1295</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1525</td>
</tr>
</tbody>
</table>
In the ligands, the following assignments may be made:

$\nu$(NH) $\sim$ 3200 cm$^{-1}$, $\nu$(Intramolecular H-bonded -OH) 2800-2700 cm$^{-1}$, $\nu$(C=O) 1670-1650 cm$^{-1}$, $\nu$(C=N) 1625-1610 cm$^{-1}$ and $\nu$(C-O) $\sim$ 1280 cm$^{-1}$.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Ligand No.</th>
<th>Complex No.</th>
<th>$\nu$(NH)</th>
<th>$\nu$(C=O)</th>
<th>$\nu$(C=N)</th>
<th>$\nu$(C=O)</th>
<th>$\nu$(C-O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>VI</td>
<td>XIV</td>
<td>-</td>
<td>-</td>
<td>1640</td>
<td>1598</td>
<td>1330</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1615</td>
<td>1562</td>
<td>1295</td>
</tr>
<tr>
<td>7</td>
<td>VII</td>
<td>XV</td>
<td>-</td>
<td>-</td>
<td>1642</td>
<td>1590</td>
<td>1330</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1616</td>
<td>1555</td>
<td>1282</td>
</tr>
<tr>
<td>8</td>
<td>VIII</td>
<td>XVI</td>
<td>-</td>
<td>-</td>
<td>1630</td>
<td>1590</td>
<td>1328</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1618</td>
<td>1555</td>
<td>1295</td>
</tr>
</tbody>
</table>
OH is also reported in salicylidene anilines. In the ligands V to VIII, one can expect two types of intramolecular H bonded -OH: one with azomethine -N- and other with carbonyl -O-.

In the ligands, two intense bands are observed in the region 1670-1610 cm\(^{-1}\). Of these, the band in the region 1670-1650 cm\(^{-1}\) is assigned to \(\nu(C=O)\) and that in the region
1625-1610 cm$^{-1}$ may be assigned to $\nu$(C=N).\textsuperscript{13,14}

In the complexes of the ligands I-IV the band due to $\nu$(NH) is retained, and others due to $\nu$(C=O) and $\nu$(C=N) shift to the lower frequency indicating that both C=O and C=N are coordinatively bonded to the zinc ion through -O- and -N- respectively. This suggests that the ligands exist in the \textit{keto form}.

In the complexes of the ligands V-VIII the band due to $\nu$(NH) is absent. The C=N band shows low frequency shift, suggesting coordination through -N- of the C=N group. An intense band observed in the region 1642-1650 cm$^{-1}$ may be assigned to $\nu$(C=N) generated due to the \textit{enolic form} of the ligand. The phenolic C-O band around 1280 cm$^{-1}$ appears in the region 1325-1300 cm$^{-1}$ and the band due to intramolecular H-bonded -OH disappears in the complexes, IX-XII. Whereas, it is retained in the complexes, XIII-XVI and may be due to the OH, on the hydrazide residue, intramolecularly hydrogen bonded to the -N- of the free (C=N) group. All these evidences show that in these complexes the ligands exist in the \textit{enol form}.

The complexes of the ligands I-IV have 1:2 stoichiometry and spectral evidences show that the ligands
behave as tridentates coordinating through C=O, C=N and oxygen of OH group.

Hence complexes have coordination number six.

The complexes of the ligands V-VIII have 1:1 stoichiometry. All the coordinating groups and one of the active groups are involved in the bond formation. Thus these ligands show tridentate behaviour and complexes appear to have coordination number three. It seems improbable in view of the known complexes of coordination.
In order to keep the minimum coordination number, the complexes must have undergone dimerisation. The examples of dimeric complexes with such type of ligands are numerous in the literature. However, the dimeric nature of the complexes can not be substantiated by the molecular weight determination because of their insolubility.

Complexes of Cd(II)

The complexes are yellow in colour, insoluble in common organic solvents. To some extent they are soluble
in DMSO. The results of the elemental analysis (Table 3) show that the complexes have 1:2 stoichiometry.

**Conductance**

The molar conductance in DMSO at the concentration $\sim 10^{-3}$ M is too small to measure. Hence the complexes are non-electrolytes.

**Infrared Spectra**

The important infrared frequencies of the ligands and the complexes along with their assignments are shown in Table 4. A few spectra of the complexes are represented in Figs. 3 and 4.

All the complexes show medium intensity broad band in the region 3225-3150 cm$^{-1}$ due to NH stretch. The complexes formed of the ligands I-IV, do not display any band in the region 2800-2700 cm$^{-1}$, whereas, the complexes of the ligands V-VIII have broad weak band around 2700 cm$^{-1}$ characteristic of intramolecular H-bonded OH. The bands of the ligands associated with the C=O and C=N stretching vibrations Table 4 show measurable shift towards low frequency in the complexes supporting the view that both C=O and C=N are involved in the coordinate bond formation.
### TABLE 4

Important infrared frequencies (in cm⁻¹) of Cd(II) complexes with aroyl hydrazones and their assignments

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Ligand No.</th>
<th>Complex No.</th>
<th>(NH)</th>
<th>(C=O)</th>
<th>(C=N)</th>
<th>(C=O)</th>
<th>(O=O)</th>
<th>(Cd-N)</th>
<th>(Cd-O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I</td>
<td>XVII</td>
<td>3150m</td>
<td>1625s</td>
<td>1575s</td>
<td>1575s</td>
<td>1305s</td>
<td>530s</td>
<td>460s</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1555s</td>
<td>1500m</td>
<td></td>
<td>430s</td>
</tr>
<tr>
<td>2</td>
<td>II</td>
<td>XVIII</td>
<td>3160m</td>
<td>1630s</td>
<td>1575s</td>
<td>1575s</td>
<td>1325s</td>
<td>540s</td>
<td>460s</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1555s</td>
<td>1500w</td>
<td></td>
<td>430s</td>
</tr>
<tr>
<td>3</td>
<td>III</td>
<td>XIX</td>
<td>3150m</td>
<td>1625s</td>
<td>1580s</td>
<td>1580s</td>
<td>1325s</td>
<td>535s</td>
<td>465s</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1545s</td>
<td>1500m</td>
<td></td>
<td>430s</td>
</tr>
<tr>
<td>4</td>
<td>IV</td>
<td>XX</td>
<td>3160m</td>
<td>1625s</td>
<td>1585s</td>
<td>1575s</td>
<td>1325s</td>
<td>530s</td>
<td>470s</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1560s</td>
<td>1500s</td>
<td></td>
<td>445s</td>
</tr>
<tr>
<td>5</td>
<td>V</td>
<td>XXI</td>
<td>3220m</td>
<td>1625s</td>
<td>1580s</td>
<td>1580s</td>
<td>1340s</td>
<td>535s</td>
<td>480s</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1565s</td>
<td>1280m</td>
<td></td>
<td>445s</td>
</tr>
</tbody>
</table>
In the ligands the following assignments may be made:

(NH) £ 3200 cm$^{-1}$, (Intramolecular H- bonded -OH) £ 2800-2700 cm$^{-1}$,
(C=O) £ 1670-1650 cm$^{-1}$, (C=N) £ 1625-1610 cm$^{-1}$ and (C=O) £ 1280 cm$^{-1}$.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Ligand No.</th>
<th>Complex No.</th>
<th>(NH)</th>
<th>(C=O)</th>
<th>(C=N)</th>
<th>(C=O)</th>
<th>(C=O)</th>
<th>(Cd-N)</th>
<th>(Cd-O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>VI</td>
<td>XXII</td>
<td>3150m</td>
<td>1620s</td>
<td>1575s</td>
<td>1575s</td>
<td>1555w</td>
<td>1480s</td>
<td>1290s (br)</td>
</tr>
<tr>
<td>7</td>
<td>VII</td>
<td>XXIII</td>
<td>3150m</td>
<td>1625s</td>
<td>1575s</td>
<td>1575s</td>
<td>1500w</td>
<td>1290m</td>
<td>530s</td>
</tr>
<tr>
<td>8</td>
<td>VIII</td>
<td>XXIV</td>
<td>3225m</td>
<td>1625s</td>
<td>1585s</td>
<td>1585s</td>
<td>1565w</td>
<td>1510w</td>
<td>1320m</td>
</tr>
</tbody>
</table>
The three high intensity bands in the region 1600-1500 cm\(^{-1}\) are due to the aromatic C=C stretching vibrations.

All the complexes show high frequency shift of the band around 1280 cm\(^{-1}\) attributable to the phenolic C–O stretch. In complexes XXI to XXIV there is a band around 1280 cm\(^{-1}\) having strong intensity. This is assigned to the phenolic C–O due to salicyloylhydrazide moiety.

These observations make us to envisage that the ligands I–VIII exist in the keto form in the complexes.

Of the several bands observed in the 600-400 cm\(^{-1}\) region which appear unchanged in the intensity and positions are due to the ligand skeletal vibrations. It is rather difficult to make the conclusive assignments amidst the high intensity skeletal bands which interfere with the M–N and M–O and M–\(\bar{O}\) vibrations. Hence the assignments made here are based on the reported data and are tentative.

Amongst the three intense bands which appear in the 600-500 cm\(^{-1}\) region the band around 535 cm\(^{-1}\) is assigned to the Cd–N stretch as it shows little variation whereas the remaining bands are inert to the complexation. This assignment closely agrees with the previous assignments\(^8,17-22\). The band observed in the region 490-460 cm\(^{-1}\) is an intense
one and is assigned to the Cd−O band in view of the previous assignments. The band observed in the region 445-430 cm$^{-1}$, on analogy with the previous data, is assigned to the Cd−O stretch. All these bands show little variation in their positions indicating that all these complexes have the same coordination number.

On the basis of analytical data, infrared spectral results and the known hexacovalency of cadmium(II), the following structure may be proposed.
SUMMARY

Zn(II) complexes have been prepared by reacting zinc acetate with aroyl hydrazones in aqueous ethanolic medium. The elemental analyses indicate 1:2 or 1:1 stoichiometry depending on the ligands. On the basis of the infrared spectral studies, coordination number four and six have been suggested.

Eight complexes of Cd(II) have been prepared by reacting cadmium acetate with aroyl hydrazones in aqueous ethanolic medium. The elemental analyses indicate 1:2 stoichiometry. On the basis of infrared spectral studies, it has been shown that the ligands react in the keto form and the complexes have coordination number six.
REFERENCES


