DIAMAGNETIC CORRECTIONS OR PASCAL CONSTANT/
PUBLICATIONS/
CERTIFICATIONS OF PARTICIPATION IN NATIONAL OR
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Diamagnetic corrections or Pascal’s Constant in $10^5$ /g atom or $10^6$ erg G$^{-2}$ mol$^{-1}$

<table>
<thead>
<tr>
<th>Species</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu$^{2+}$</td>
<td>12.8</td>
</tr>
<tr>
<td>Ni$^{2+}$</td>
<td>12.8</td>
</tr>
<tr>
<td>Co$^{2+}$</td>
<td>12.8</td>
</tr>
<tr>
<td>Fe$^{2+}$</td>
<td>12.8</td>
</tr>
<tr>
<td>Other first row transition metals</td>
<td>13.0</td>
</tr>
<tr>
<td>H$_2$O</td>
<td>13</td>
</tr>
<tr>
<td>H</td>
<td>2.93</td>
</tr>
<tr>
<td>C</td>
<td>6.00</td>
</tr>
<tr>
<td>N (ring)</td>
<td>4.61</td>
</tr>
<tr>
<td>N (open chain)</td>
<td>5.57</td>
</tr>
<tr>
<td>O (carbonyl)</td>
<td>3.36</td>
</tr>
</tbody>
</table>
Crystal structures and mesomorphic properties of Schiff base homologs and derivatives, and magnetic properties of their dimeric and dinuclear copper(II) complexes

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ABSTRACT
Three \( \mathrm{H}_2 \mathrm{O} \) Schiff base homologs, \( \text{H}_2 \text{Li}(n = 8), \text{H}_2 \text{Li}(n = 9), \) and \( \text{H}_2 \text{Li}(n = 10) \) were obtained from the reactions of \( \text{2-HOC}_2 \text{H}_2 \text{CHO} \) with \( \text{H}_2 \text{NiCH}_3 \text{H}_2 \text{NH} \), while a derivative of \( \text{H}_2 \text{Li} \), namely, \( \text{H}_2 \text{L}_2 \), was obtained from the reaction of \( \text{3.5-C}_5 \text{H}_5 \text{H}_2 \text{CHO}(\text{X} = \text{tert-butyl}) \) with \( \text{H}_2 \text{NiCH}_3 \text{H}_2 \text{NH} \). The Schiff bases \( \text{H}_2 \text{L}_2 \) (triclinic; \( \text{P} \)\( \overline{1} \)), \( \text{H}_2 \text{L}_3 \) (monoclinic; \( \text{C} \)\( \text{2} \)\( \overline{1} \)), and \( \text{H}_2 \text{L}_4 \) (monoclinic; \( \text{P2} \)\( \text{1} \)\( \text{c} \)) were single crystals with low melting temperatures (less than 100°C). The homologs exhibited mesomorphism, while the derivative was not mesomorphic and did not reform crystals from its melt. Copper(II) complexes of \( \text{H}_2 \text{Li}(n = 10) \) and \( \text{H}_2 \text{Li}(n = 9) \) were dimeric, while that of \( \text{H}_2 \text{Li}(n = 8) \) was dimeric with chelating \( \text{CH}_2 \text{CO} \) ligand. These complexes were paramagnetic with insignificant interactions between the copper(II) atoms and have high decomposition temperatures (\( T_{\text{d}} \) \( = \) \( 268-304^\circ \text{C} \)). Their melting temperatures (\( T_{\text{m}} \) \( = \) \( 138-9-192^\circ \text{C} \)) were higher than the corresponding Schiff bases, but they were not mesomorphic.

Introduction
Schiff bases formed from polymethylenediamines with suitably selected carbonyls were reported to form metal complexes exhibiting tunable nuclearity, geometry, and magnetic properties [1–11]. As examples, Nathan et al. in 2003 [1] obtained crystals of \([\text{Cu}(\text{Sal-n})] \) \( (\text{H}_2 \text{Sal-n}) \) were Schiff bases formed from \( \text{H}_2 \text{NiCH}_3 \text{H}_2 \text{NH} \) and \( 2-\text{HOC}_2 \text{H}_2 \text{CHO} \). The structures of these complexes were either dimeric cis planar (\( n = 2 \)), monomeric tetrahedral (\( n = 3, 4 \)), or dimeric trans planar (\( n = 5, 6 \)). Later in 2009, Mitra et al. [8] reported an almost linear trinuclear Cu(II) complex, \([\text{Cu}_3(\mu_2-\text{L})_2(\text{ClO}_4)_6]\) \( (\text{Cu}_2(\mu_2-\text{L})_2(\text{H}_2 \text{O})_4(\text{ClO}_4)_2) \) \( (\text{H}_2 \text{L}_2 \) was Schiff base formed from \( 1,3 \)-diaminopentane and \( 2-\text{HOC}_2 \text{H}_2 \text{CHO} \), which showed strong intratramer (\( T \approx \approx 202 \text{ cm}^{-1} \)) but very weak intertramer (\( T \approx \approx 0.1 \text{ cm}^{-1} \)) antiferromagnetic interactions. The accumulated knowledge from such works has made it easier to design functional materials with tunable properties.

Our research is focused on thermally stable molecular magnetic materials. The impetus for the work presents in this paper arose from molecular structure of \( 2,2' \)-(nonane-1,9-diylbis(nitrilotetraethylene)) diphenol \( (\text{H}_2 \text{L}_3) \), formed from \( \text{H}_2 \text{NiCH}_3 \text{H}_2 \text{NH} \) and \( 2-\text{HOC}_2 \text{H}_2 \text{CHO} \) [12]. This paper reports the syntheses, characterizations, magnetic,
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Complexes of nickel(II) carboxylates with pyridine and cyclam: crystal structures, mesomorphisms and thermoelectrical properties

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Keywords:

Nickel(II) carboxylates, Pyridine, Cyclam, Mesomorphisms, Thermoelectric

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