Table 2 Data on molar polarizations and dipole moments of hexahydro-s-triazine at 25°C

<table>
<thead>
<tr>
<th>Compound</th>
<th>( P_{\beta} ) (cc)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \text{C}_6\text{H}_6 )</td>
</tr>
<tr>
<td>I 1,3,5-triphenyl-hexahydro-s-triazine</td>
<td>129.0</td>
</tr>
<tr>
<td>II 1,3,5-tri-(4-methyl)-phenyl-</td>
<td>149.5</td>
</tr>
<tr>
<td>phenyl-</td>
<td></td>
</tr>
<tr>
<td>III 1,3,5-tri-(4-chloro)-phenyl-</td>
<td>156.0</td>
</tr>
<tr>
<td>phenyl-</td>
<td></td>
</tr>
<tr>
<td>IV 1,3,5-tri-(4-methoxy)-phenyl-</td>
<td>160.5</td>
</tr>
<tr>
<td>phenyl-</td>
<td></td>
</tr>
<tr>
<td>V 1,3,5-tri-(4-ethoxy)-phenyl-</td>
<td>150.0</td>
</tr>
<tr>
<td>phenyl-</td>
<td></td>
</tr>
<tr>
<td>VI 1,3,5-tri-(4-nitro)-phenyl-</td>
<td>140.0</td>
</tr>
</tbody>
</table>

which is the sum of orientation polarization \( P_0 \) and
induced polarization \( P_i \). \( P_0 \) is the sum of electronic
polarization \( P_e \) and atomic polarization
\( P_a = R_{M_{12}} \), and \( P_a = 0.15 \) \( R_{M_{12}} \). The molar
refractivity \( R_{M_{12}} \) of solutes is determined from the
extrapolation of the plots of \( R_{1.2} = f(x_2) \) as \( x_2 \) tends
to zero.

The values of permanent electric moments of the
six phenyl substituted hexahydro-s-triazines are
listed in table 2. The dipole moment values clearly
support the idea of the existence of stereochemical
isomerism in these compounds. On comparing the
permanent dipole moment values of individual
compounds from I to VI, it is seen that if the
para-substituent in the phenyl ring has a positive
inductive effect (+I) the d.m. value (\( \mu \)) decreases
and if it has a negative inductive effect (−I) the d.m.
value increases. The reason may be laid as follows.
The distortion of the chair or boat conformation
may occur due to the lone pair-lone pair repulsion
which is enhanced in case of +I effect substituents.
Also, due to the electron withdrawal of the −I effect
substituents, the repulsion between the lone pairs
diminishes and the probability of a proper alignment
of the lone pairs along the same direction would be
greater. This effect leads to a comparative increase
in the dipole moment for compounds with −I effect
phenyl ring substituents.

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