Sidnones are peculiar compounds, whose molecular structure cannot be expressed by covalent formulas of any sort. Usually sidnones are regarded as nonbenzoid aromatic compounds, in which the carbonyl group is strongly polar, and there is a closed system of $6\pi$-electrons in the nucleus [1]. In view of this, a very widespread formula for representing the structure of sidnones is the one given below (I):

\[
\begin{aligned}
\text{N} & \text{C} \\
\text{N} & \text{R} \\
\text{O} & \text{C} \\
\text{O} & \\
\end{aligned}
\]

However, some of the properties and the data relative to sidnones do not agree with this formula. Included in this number are, for example, the ease with which electrophilic, but not nucleophilic $O_4$ substitution reactions can be carried out [2], the high value of the carbonyl group frequency in the infrared spectra (1730-1770 cm$^{-1}$) [3, 4], and the interatomic distance of the $C = O$ bond [5] in 3-p-bromphenylsidnone, which corresponds to a typical double bond, not to a $C - O$ bond. Apparently, some degree of consistency between these data and formula (I) may be brought about by considering the fact that the positive charge is not uniformly distributed around the ring since the atoms have different electronegativities, the atoms differing not only in the magnitude but in the sign of their charge, and the polarization of the carbonyl group does not reach the limiting value corresponding with formula (I).

In view of this, some other formulas (II, III) have been proposed [2, 3]

\[
\begin{aligned}
\text{N} & \text{C} \\
\text{N} & \text{R} \\
\text{O} & \text{C} \\
\text{O} & \\
\end{aligned}
\]

which accord better with the properties of the sidnones. Actually, the negative charge on $O_4$ (for example, in formula (III)) can serve to explain the ease with which electrophilic substitutions go on this atom, and the $C = O$ double bond in these formulas seems to be in good agreement with the data on the frequencies and interatomic distances in the $C = O$ groups of the sidnones. However, the question of using the frequencies of the $C = O$ group to find the degree of doublebondedness or the polarity of the carbonyl group was discussed in a paper by Borod'ko and Syrkin [6], where the authors came to the conclusion that the frequencies cannot be used for this purpose. Apparently, from this point of view, the data on the interatomic distance are no indices either. Although this conclusion requires further confirmation, there is no doubt about it that in studying compounds like sidnones one has to be careful about evaluating the various pieces of data, and as many different methods of investigation as possible must be used.

It may be seen from a consideration of formulas (I)-(III) that a very important factor for establishing the structure of the sidnones is the polarity of the carbonyl group, since this, along with the charge distribution in the nucleus, differentiates between one proposed formula and another.
**TABLE 1. Frequencies and Intensities of C = O Bands in Infrared Spectra of Sidrones**

<table>
<thead>
<tr>
<th>Compound</th>
<th>C = O frequency, cm⁻¹</th>
<th>Intensity, M⁻¹ liter · cm⁻² · 10⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in the crystalline state</td>
<td>in CHCl₃</td>
</tr>
<tr>
<td>C₆H₅-N-CH</td>
<td>1738*</td>
<td>1750</td>
</tr>
<tr>
<td>C₂H₅-N-CH</td>
<td>1741</td>
<td>1747</td>
</tr>
<tr>
<td>i-C₆H₅-N-CH</td>
<td>1744</td>
<td>1751</td>
</tr>
<tr>
<td>C₆H₅-N-CH</td>
<td>1758</td>
<td>1752</td>
</tr>
<tr>
<td>p-NO₂-C₆H₅-N-CH</td>
<td>1780</td>
<td>1750</td>
</tr>
<tr>
<td>m-Cl-C₆H₅-N-CH</td>
<td>1738</td>
<td>1770</td>
</tr>
<tr>
<td>C₆H₅-N-C₆H₅</td>
<td>1757</td>
<td>1750</td>
</tr>
<tr>
<td>C₆H₅-N-C₆H₅</td>
<td>1756</td>
<td>1753</td>
</tr>
<tr>
<td>C₆H₅-N-Br</td>
<td>1779</td>
<td>1738</td>
</tr>
<tr>
<td>C₆H₅-N-C-NO₂</td>
<td>1822</td>
<td>1810</td>
</tr>
</tbody>
</table>

*For the majority of the compounds in the crystalline state what is given is the frequency of the fundamental, more intense band. The splitting in these cases shows up only as a bump on the band.

Therefore a very promising method of approach is to find the integral intensities of the carbonyl bands* in the infrared spectra of the sidrones, which ought to give a less ambiguous answer as to the degree of polarity of the carbonyl group. It is well known that the band intensities are determined by the change in dipole moment along the normal coordinate, a parallelism often being observed between the integral intensity and the polarity of the bond.

In view of this, we have measured the integral intensities of the C = O bands in the infrared spectra of a number of sidrones with various substituents.

*The results of measuring the integral intensity of the C = O bands in the infrared spectrum of 3-ethylsidnone were reported by us at the XIII Conference on Spectroscopy and in [7] and the results for 3-phenyl- and 3-ethylsidnone are given in the paper by Borod'ko and Syrkin [6].