A comment on 'A simple method for measuring crystal densities' (Zamvil, Pludow & Fucaloro, 1978)

Zamvil, Pludow & Fucaloro (1978) suggested a rapid method to measure the density of a liquid mixture by determining the refractive index of that mixture, and obtaining its density from a calibration table. However they selected benzene/ethanol mixtures whose densities range from 0.7999 to 0.8671 Mg m\(^{-3}\). Midgley (1951) recommended the use of methylene iodide-benzene mixture which gave a density range from 0.877 to 3.316 Mg m\(^{-3}\). However he stated that the refractive index and density of liquid mixtures are approximately proportional to the quantity of each component.

We have tried to apply this method to other mixtures but found the relationship to have a limited linear range (Table 1).

Table 1. Density and refractive index for some solution mixtures

<table>
<thead>
<tr>
<th>Compound</th>
<th>(\rho)</th>
<th>(n(20^\circ))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroform-toluene</td>
<td>1.20-1.42</td>
<td>1.470-1.450</td>
</tr>
<tr>
<td>Methyliodide-chloroform</td>
<td>1.55-1.98</td>
<td>1.450-1.495</td>
</tr>
<tr>
<td>Bromoform-methyliodide</td>
<td>2.33-2.60</td>
<td>1.540-1.575</td>
</tr>
</tbody>
</table>

Zamvil, Pludow & Fucaloro (1978) said that it was necessary to have a knowledge of the mixture composition so that the Lorentz-Lorenz relation could be used. However, because this information is not always readily available, the practical way, as referred to by Midgley (1951), of preparing a calibration curve of refractive index against density is recommended.

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