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NOTE

Binary System of Diethyl Ether with Chloro-alkanes, Benzene, Toluene and Xylene

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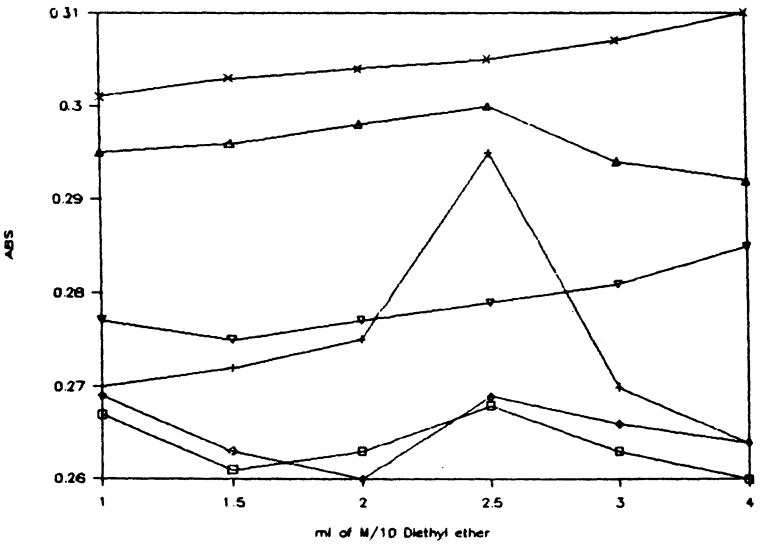
Spectral absorbance of dye indicator for binary mixtures of diethyl ether with chloro-alkanes, benzene, toluene or xylene indicates molecular interactions among these liquids. Some of them indicate higher peak absorbance and few cases lower absorbance. An interpretation has been offered.

Negative values V^E of benzene-diethyl ether have been reported by Rastogi *et al.*[1], which provide strong evidence for the specific interaction between the components. These investigations were extended to binary mixtures of diethyl ether with toluene *o*-, *m*-, *p*-xylenes in order to examine the effect of increasing number of methyl groups and their relative position in benzene ring on the extent of molecular interaction[2].

Diethyl ether was purified by distillation and it was stored in a brown bottle wrapped with black paper. Diethyl ether and chloro-alkanes, benzene or toluene or xylene (M/10 concentration solution) and dye dimethyl yellow (D.M.Y.) (5.0×10^{-5} M concentration solution) were prepared in petroleum ether (60–80°C), different sets of solutions were prepared by increasing diethyl ether concentration and chloro-alkanes or benzene or toluene or xylene, dye dimethyl yellow (D.M.Y.) concentrations being kept constant and made up to 25 mL with petroleum ether.

A Shimadzu double beam spectro-photometer UV-160 A was used for spectral measurements. Absorbance of pure dye solution at λ_{max} in each set of solutions was measured and plotted against increasing diethyl ether concentration. The graphs indicated peak corresponding to the ratio of two liquids in stoichiometric proportion. These are indicated in Graph-I.

Higher peak values of absorbance with $CHCl_3$, CH_2Cl_2 indicate stronger interaction with $CHCl_3$ and CH_2Cl_2 than with CCl_4 non-polar in pure liquid form. Benzene interaction is stronger than that of toluene or xylene because of C_6H_6 π-electrons, which are immobilised in toluene or xylene due to methyl groups, showing no peak.



□ mL of M/10 diethyl ether + 2.5 mL M/10 CCl_4 + 5 mL 5.0×10^{-5} M.D.M.Y.
\+ mL of M/10 diethyl ether + 2.5 mL M/10 $CHCl_3$ + 5 mL 5.0×10^{-5} M.D.M.Y.
◊ mL of M/10 diethyl ether + 2.5 mL M/10 CH_2Cl_2 + 5 mL 5.0×10^{-5} M.D.M.Y.
Δ mL of M/10 diethyl ether + 2.5 mL M/10 C_6H_6 + 5 mL 5.0×10^{-5} M.D.M.Y.
× mL of M/10 diethyl ether + 2.5 mL M/10 Toluene + 5 mL 5.0×10^{-5} M.D.M.Y.
∇ mL of M/10 diethyl ether + 2.5 mL M/10 Xylene + 5 mL 5.0×10^{-5} M.D.M.Y.

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