Available online at **www.joac.info**

ISSN: 2278-1862

Journal of Applicable Chemistry

2018, 7 (4): 1063-1071

(International Peer Reviewed Journal)

Refractive Indices and Excess Properties of Binary Mixtures of p-Cymene with Fluorobenzene, Chlorobenzene and Bromobenzene at T = 303.15, 308.15 and 313.15 K

Madhuresh Makavana[1] and Sangita Sharma[2*]

1. Department of Chemistry, Mehsana Urban Institute of Sciences, Ganpat University, Ganpat Vidyanagar, Kherva, Mehsana,Gujarat-384012, **INDIA**
2. Department of Chemistry, Hemchandracharya North Gujarat University, Patan, Gujarat-384265, **INDIA**

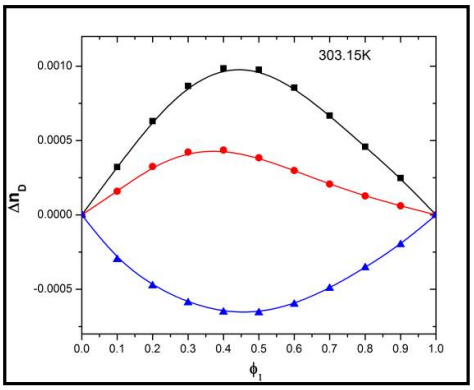
Email: smridhee2000@yahoo.co.in

Accepted on 9th July, 2018

ABSTRACT

Refractive indices (n_D) of binary mixtures of p-cymene with fluorobenzene, chlorobenzene and bromobenzene were measured using Abbe refractometer at 303.15, 308.15 and 313.15 K along the whole composition range and at normal pressure. From the experimental data, deviation in refractive indices (Δn_D), molar refraction (ΔR_m) and deviation in molar refraction (ΔR_m) were calculated. Excess properties were satisfactorily fitted using the Redlich-Kister polynomial equation to derive the standard deviations (σ). These values were reported as a function of volume fraction (ϕ_1) or mole fraction (X_1) of p-cymene. Theoretical study of nine mixing rules of refractive index has been carried out to investigate their validity for these mixtures over the whole mole fraction of p-cymene at all studied temperatures. Results indicated that there is a strong dipole-dipole interaction present in the p-cymene + fluorobenzene binary mixture when compared to chlorobenzene and bromobenzene binary mixtures.

Graphical Abstract



Deviation in refractive index (Δn_D)as a function of volume fraction (ϕ_1) for p-Cymene (1) + Fluorobenzene (2) (■), p-Cymene (1) + Chlorobenzene (2) (●), p-Cymene (1) + Bromobenzene (2) (▲) at *T*= 303.15K..

Keywords: Refractive Index, Molar Refraction, Theoretical mixing rules, Intermolecular interaction.