Critical Behavior of the Dielectric Modulus in Nitrobenzene-Dodecane Mixture

P. Malik, S. J. Rzoska, A. Drozd-Rzoska, W. W. Sułkowski[a], and J. Jadżyn[b]

Institute of Physics, Silesian University, ul. Uniwersytecka 4, 40-007 Katowice, Poland
[a] Institute of Chemistry, Silesian University, ul. Szkolna 9, 40-006 Katowice, Poland
[b] Institute of Molecular Physics, Polish Academy of Sciences,
ul. Smoluchowskiego 17, 60-189 Poznań, Poland

Reprint requests to Prof. S. J. R.; E-mail: rzoska@us.edu.pl

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The dielectric properties of a homogenous critical mixture of nitrobenzene-decane were studied in the range 1 Hz$< f$1 Mz. The temperature dependences of the "static" dielectric permittivity ε' (1 MHz) and the electric conductivity σ(1 Hz) exhibit pretransitional anomalies which may be associated with the same critical exponent $\phi = 1 - \alpha \approx 0.88$, where α is the critical exponent of the specific heat. The same data were analyzed using the dielectric modulus representation. They show loss curves for the imaginary part of the modulus $M''(f)$. It was found that the temperature evolutions of the peak frequency $\tau = 1/2\pi f_p$ and the peak maximum of $M'' = M''(f_p)$ also exhibit critical anomalies. Their forms resemble anomalies obtained for the imaginary part of the dielectric permittivity $\varepsilon''(f)$, carried out for 40 MHz $< f <$1 GHz, in an ethanol-dodecane critical mixture [S. J. Rzoska, K. Orzechowski, and A. Drozd-Rzoska, Phys. Rev. E **65**, 042501 (2002)]. – *PACS:* 64.70.Ja, 77.20.+y , 64.60.Fr

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