

Accepted Manuscript

Static permittivities, viscosities, refractive indices and electrical conductivities of the binary mixtures of acetonitrile with poly(ethylene glycol)-200 at temperatures 288.15–318.15 K

R.J. Sengwa, Priyanka Dhatarwal, Shobhna Choudhary



PII: S0167-7322(18)32438-3
DOI: doi:[10.1016/j.molliq.2018.08.137](https://doi.org/10.1016/j.molliq.2018.08.137)
Reference: MOLLIQ 9582
To appear in: *Journal of Molecular Liquids*
Received date: 10 May 2018
Revised date: 24 July 2018
Accepted date: 25 August 2018

Please cite this article as: R.J. Sengwa, Priyanka Dhatarwal, Shobhna Choudhary , Static permittivities, viscosities, refractive indices and electrical conductivities of the binary mixtures of acetonitrile with poly(ethylene glycol)-200 at temperatures 288.15–318.15 K. Molliq (2018), doi:[10.1016/j.molliq.2018.08.137](https://doi.org/10.1016/j.molliq.2018.08.137)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Static permittivities, viscosities, refractive indices and electrical conductivities of the binary mixtures of acetonitrile with poly(ethylene glycol)-200 at temperatures 288.15–318.15 K

R. J. Sengwa^{a,*}, Priyanka Dhatarwal^a, Shobhna Choudhary^{a,b}

^a*Dielectric Research Laboratory, Department of Physics, Jai Narain Vyas University, Jodhpur – 342 005, India*

^b*CSIR-National Institute of Science Communication and Information Resources, New Delhi–110 012, India*

ABSTRACT

Relative static permittivities, viscosities, refractive indices and electrical conductivities of the binary mixtures of acetonitrile (ACN) with poly(ethylene glycol) (PEG; $M_w = 200 \text{ g mol}^{-1}$) over the whole composition range and temperatures from 288.15 K to 318.15 K have been reported. The excess properties determined from the volume fraction based additive relation confirm that the hydrogen-bond interactions between the ACN and PEG molecules in their mixtures contribute to permittivities slight positively, whereas, these interactions greatly reduce the viscosities of the mixtures. The viscosity activation energy and conductivity activation energy values for the ACN–PEG mixtures are found decreasing with the increase of ACN concentration in the mixtures. The charge conduction behaviour in the dielectric viscous media of these binary mixtures has been analyzed by using the values of ac electrical conductivity and viscosity product further included with static permittivity at different temperatures. The complex permittivity, ac electrical conductivity, and impedance spectra over the frequency range from 20 Hz to 1 MHz at 298.15 K have also been investigated for these mixtures. The static permittivity frequency range over which the dielectric and electrical spectra of these mixtures are affected by the electrode polarization process has been explored. A correlation between electrode polarization relaxation time and dc electrical conductivity has been observed for the ACN–PEG mixtures.

* Corresponding author.

E-mail address: rjsengwa@rediffmail.com; rjs.ph@jnvu.edu.in (R.J. Sengwa)

Download English Version:

<https://daneshyari.com/en/article/10141497>

Download Persian Version:

<https://daneshyari.com/article/10141497>

[Daneshyari.com](https://daneshyari.com)