

Accepted Manuscript

Solvatochromism of Fluorescein in Aqueous Aprotic Solvents

Fereshteh Naderi, Ali Farajtabar

PII: S0167-7322(16)31105-9
DOI: doi: [10.1016/j.molliq.2016.05.071](https://doi.org/10.1016/j.molliq.2016.05.071)
Reference: MOLLIQ 5885

To appear in: *Journal of Molecular Liquids*

Received date: 4 May 2016
Revised date: 16 May 2016
Accepted date: 23 May 2016



Please cite this article as: Fereshteh Naderi, Ali Farajtabar, Solvatochromism of Fluorescein in Aqueous Aprotic Solvents, *Journal of Molecular Liquids* (2016), doi: [10.1016/j.molliq.2016.05.071](https://doi.org/10.1016/j.molliq.2016.05.071)

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.

Solvatochromism of Fluorescein in Aqueous Aprotic SolventsFereshteh Naderi ^{a,*}, Ali Farajtabar ^b^a *Department of Chemistry, Shahr-e-Qods branch, Islamic Azad University, Tehran, Iran*^b *Department of Chemistry, Jouybar branch, Islamic Azad University, Jouybar, Iran***ABSTRACT**

Fluorescein solvatochromism was studied in pure aprotic solvents dimethylsulfoxide, N,N-dimethylformamide, acetonitrile and acetone, and their aqueous mixtures. The type and extent of solvent effects were identified and interpreted based on the electronic structure of fluorescein and the nature of the solvent. The main effect of hydrogen bonding interaction was observed on solvatochromism. A modified preferential solvation model was used to gain a reliable insight into the contribution of solvent-solvent interactions to solvatochromism as well as the local and bulk mole fraction distribution of solvation species. Results indicate that the solvation shell of the solute is mainly affected by the solvent-solvent interaction.

Keywords: Fluorescein; solvatochromism; nonideality; preferential solvation; local composition

1. Introduction

The solvent effect is a fascinating subject of research in solution chemistry because the environment has an essential role on the solute behavior, and therefore on the thermodynamics and kinetics of reactions in solution. In this direction, solvatochromism, defined as the spectral changes of solute induced by the solvent, opens a convenient way to achieve a molecular understanding of the solvent effects [1, 2]. The electronic transition energy, E_T , of the solute in its absorption spectra depends on the energy level of the ground and excited state of the solute; by change in the surrounding media, the ground and excited state enjoy different stabilization due to its different electronic structure and consequently, solvatochromism occurs as a function of the magnitude of the solvent effect. Such behavior makes experimental

* Correspondence author.

E-mail: f.naderi@qodsiau.ac.ir

Tel/fax: +98 21 46842938

Download English Version:

<https://daneshyari.com/en/article/5409764>

Download Persian Version:

<https://daneshyari.com/article/5409764>

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