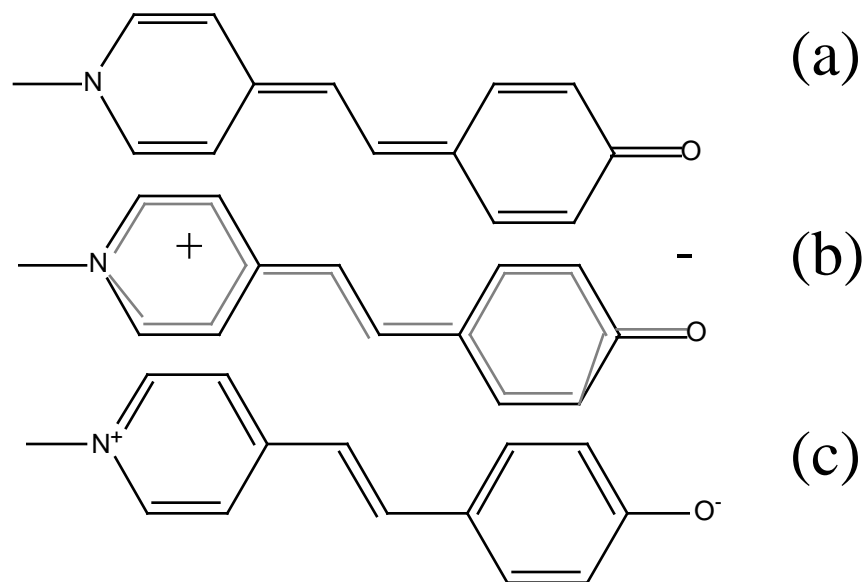


Chemistry 416, Dr. Glaser

Solvent Effects on UV/Vis Spectra: Merocyanine Dye.

A particularly interesting solvatochromic merocyanine dye is 4-[2-(1-methyl-4-pyridino)-ethenyl]phenolate. First it exhibits a bathochromic and then a hypsochromic shift of the long wave length π^* absorption band as the solvent polarity increases. Three resonance forms (a) - (c) are shown for this dye.



Solvent	$c\text{-C}_6\text{H}_{12}$	CHCl_3	H_2O
λ_{max} [nm]	592	620	442
[nm]		+28	-178
Solvent polarity	----->		

Explain this finding and address the following questions in the process. What are the relative magnitudes of the dipole moments of the ground state and of the excited states in non-polar and polar solvents? What is the most important resonance form for the ground state in non-polar and polar solvents?

For details, check the following references (after you have thought about the problem):

(a) Botrel, A.; Le Beuze, A.; Jacques, P.; Straub, H. *J. Chem. Soc. Faraday Trans. II* **1984**, *80*, 1235. (b) Jacques, P. *J. Phys. Chem.* **1986**, *90*, 5535.