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Title:	Modification of electronic states of solvent sensitive probes by vibrational strong coupling
Authors:	Sharma, Yogendra (/jspui/browse?type=author&value=Sharma%2C+Yogendra)
Keywords:	Chemistry Vibrational FTIR Spectrum Fluorescence energy Vibrational level
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Abstract:	<p>In the recent years both experimental and theoretical studies observed that chemical reaction landscape can be sculpted preciously by selective vibrational strong coupling (VSC) of reactant molecules. In VSC, excited vibrational state undergoes strong coupling with IR photons (cavity modes) which leads to the formation of hybrid light-matter states known as vibro-polaritonic state (P+ and P-). In the current project, we have studied the modification of energy levels of a solvent sensitive probe, 8-Anilinoanthracene-1-sulfonic acid (1,8-ANS) under VSC of the solvent system. It has been observed that 1,8-ANS is very sensitive to solvent environment, specifically presence of water can modify both the radiative and non-radiative decay rates of the molecules. By changing the water composition, the electronic transition energy (solvatochromism) of 1,8-ANS also getting modified. Here, we observed the fluorescence behaviour of 1,8-ANS molecule are affected by VSC of O-H stretching mode of water molecules. Concentration dependent studies show that the shift in the electronic transition energy is completely different from the non-cavity conditions. These observations open up new questions on the application of VSC for controlling bulk properties like solvent polarity and also on the modification of intrinsic behaviour of associated chromophoric systems.</p>
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