Abstract

In confined media the molecular motions are restricted due to confinement in a small region or volume which imposes severe restriction on the free motion of the solute and solvent molecules. Organized assemblies such as micelles, reverse micelles, microemulsions, lipids, vesicles, etc. are considered as suitable examples of such confined media because of their ability to confine some chemical species or solvent inside their aggregated structure. These types of confined systems are considered as "heterogeneous" at the microscopic level and regarded as microheterogeneous systems. These self-organized microheterogeneous media are interesting models for biological membranes and hence the study of various photophysical processes and dynamics in these types of systems provides a clear idea about the chemical processes that occur in natural systems. Recently room temperature ionic liquids (RTILs) are being considered as green solvent media and have been used as a polar substitute in these types of confined systems. RTIL-containing confined systems have been characterized and have become an interesting media for dynamical study which is an important aspect in the true sense. Due to the importance of the ionic liquids research have been started in various systems which includes ionic liquids as one of the component i.e. RTIL-micelle, RTIL containing microemulsions, RTIL-cosolvent mixtures, etc. Ultrafast laser spectroscopy can provide a rich view to study the structure, properties, and dynamics of these types of confined systems. In this thesis we have carried out some photophysical and dynamical studies in neat RTILs and RTIL-containing confined media by using ultrafast laser spectroscopy.

Keywords: Aggregates, Dynamics, Microheterogeneous Media, RTILs, Ultrafast Spectroscopy